THE LOGIC OF INVARIABLE CONCOMITANCE IN THE TATTVACINTĀMAṆI

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THE LOGIC OF INVARIABLE CONCOMITANCE IN THE TATTVACINTĀMAṆI

GAṄGEŚA'S ANUMITINIRŪPAṆA AND VYĀPTIVĀDA

WITH INTRODUCTION

TRANSLATION AND COMMENTARY

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TO THE MEMORY OF MY PARENTS

TO MY WIFE AND CHILDREN

PREFACE

The history of Indian logic is roughly divided into three periods: old Nyāya, Buddhist logic and new Nyāya. Each period is characterized by the production of some outstanding Sanskrit text. The main texts of the first and second period have been translated into, and explained in, European languages. But the principal text of the third period, Gaṅgeśa's Tattvacintāmaṇi, is still not accessible through a Western language. The present book is intended to fill up this gap to some extent.

The object of this study is to present both to sanskritists and to logicians an essential part of Indian logic as laid down in the first two sections of the Anumānakhaṇḍa of the Tattvacintāmaṇi. No attention will be paid here to the doctrines of Gaṅgeśa's predecessors and the theories developed by his commentators. Though this study is not concerned with comparative philosophy, Western logic will be employed for the purpose of interpretation. Under Western logic I bring both traditional logic and modern logic, which, in my opinion, form one discipline of reasoning. This may account for my use of some Latin terms belonging to scholastic thought.

Transliteration and translation have been made from the text of the Anumitinirūpaṇa and Vyāptivāda in the Bibliotheca Indica edition of Gaṅgeśa's Tattvacintāmaṇi (with Mathurānātha's commentary), Part II Anumānakhaṇḍa from Anumiti to Bādha, Calcutta, 1892. A photostatic copy of that text precedes the transliteration, translation and commentary.

For those who are familiar with the symbols of mathematical logic a symbolic interpretation is given at the end of the commentary of most of the passages dealing with logical formulations. Knowledge of the symbolism is not required for the understanding of the commentary. The use of symbols is explained in the last paragraph of the Introduction.

I wish to express my deepest gratitude to Dr. J. F. Staal, Professor of Philosophy at the University of Amsterdam, for his guidance of my work and for his willingness to accept this study as an academic dissertation.

In particular I must thank him for the generous care with which he has read the manuscript and improved it by his corrections.

I am greatly indebted to Dr. A. Scharpé, Professor of Sanskrit at the Universities of Gent and Amsterdam, for his interest in my work and for his helpful suggestions.

I should like to thank Mr. H. Boegborn, candidate of English at the University of Amsterdam, who has revised the English text, and Mrs. G. H. Kingma-Gijsbertsen, who has typed the manuscript.

If my work has any scientific value, I owe this to the example of the great scholars I have the privilege to call my teachers, of whom I wish to remember here the late Professor Louis Renou and the late Professor Evert W. Beth.

C. GOEKOOP

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INTRODUCTION

CHAPTER I

PRINCIPAL ELEMENTS OF NAVYA-NYĀYA LOGIC

§ 1. *Relations which are occurrence-exacting*

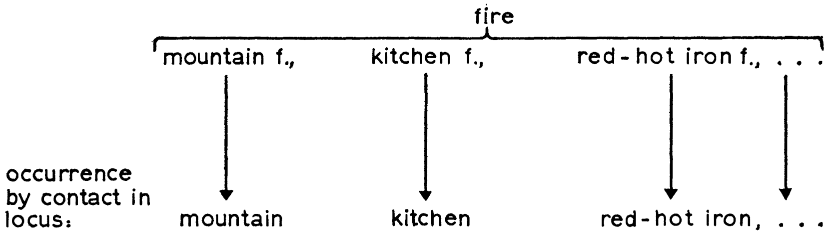
Navya-nyāya, whose chief exponent is Gaṅgeśa, is the modern school of Nyāya. The Nyāya figures among the six systems (*ṣaḍ-darśana*)[1] of Indian philosophy; its professed aim is thorough knowledge of dialectical concepts and methods as a necessary condition for the annihilation of error, sin and rebirth.

Navya-nyāya logic deals with relations. The relations it uses for logical operations are dyadic relations between attributes and subjects, not in the sense that an attribute is predicated of a subject, but in the sense that one thing, the attribute, belongs in some way to another thing, the subject; in the sense in which both godhead and the conch are attributes of Viṣṇu, who is their subject. So there is always a pair of things involved: the attribute (*dharma*), which may be called the superstratum (*ādheya*), and the subject (*dharmin*), to which we give the name of locus (*adhikaraṇa*, *āśraya*, and often expressed by the suffix *mat* or *vat*, i.e. that which possesses (the attribute)). As terms of a relation they are called adjunct (*pratiyogin*) and subjunct (*anuyogin*) respectively. Adjunct of a relation is that which is related, the subject of the relation; subjunct of a relation is that to which this subject is related, the term of the relation, in the strict sense.[2]

Relations (*saṃbandha*) are divided into occurrence-exacting (*vṛtti-niyāmaka*) relations, which involve an occurrence of the attribute in or on the locus, and non occurrence-exacting (*vṛtty-aniyāmaka*) relations, which involve no such occurrence. The first group includes the relations of contact, inherence and particular qualification; they need separate consideration.

[1] These are the orthodox systems: Sāṃkhya, Yoga, Vedānta, Mīmāṃsā, Nyāya, Vaiśeṣika. Heterodox systems are Buddhism, Jainism and Materialism (Cārvāka).
[2] Terms in the wider sense are both the subject and the term of a relation.

Contact (*saṃyoga*) is a contingent relation of substances. Two individual substances are related by contact, e.g., a pot and the ground, when a pot is on the ground; fire and the mountain, where there is fire on the mountain. To take the latter example, it is mountain fire that occurs by contact on the mountain, not kitchen fire, which occurs only in the kitchen. When we say 'Fire occurs on the mountain' or 'The mountain has fire', we mean that there is an individual fire on the mountain; it is an individual thing that has the general nature 'fire'. Fire occurs not only on a mountain, but also in a kitchen, in a red-hot iron etc.. So fire has for its loci (we can also say fire has for its locus) mountain, kitchen, red-hot iron etc.. These loci are treated as individuals, but are in fact collections of individuals, because there are several mountains, kitchens, red-hot irons etc. where fire occurs. Similarly, mountain fire, kitchen fire, red-hot iron fire etc. are conceived as individuals, though there are many cases of mountain fire, kitchen fire, red-hot iron fire etc.. Thus every instance of fire has a specific locus; in other words, the class of fires and the class of loci of fire (by contact) are equinumerous. We may illustrate this by the following diagram:



Inherence (*samavāya*) is a necessary relation of (a) a substance to its parts, (b) a quality or action to substances, and (c) a generic character to real things.

(a) A substance inheres in its parts, e.g. fire inheres in its particles (atoms).

(b) A quality inheres in substances, e.g. a colour (red etc.) inheres in substances of that colour (red etc. things). An action, too, inheres in substances, e.g. movement inheres in moving substances.

(c) Generic characters (*jāti*) are abstracts such as reality, substance-

ness, potness, which characterize real things. Reality (*sattā* or *sattva*) is the widest of all generic characters; it inheres in all members of the first three categories[3], viz. substances, qualities and actions. Substanceness inheres in all substances. Potness inheres in all pots. Inherence of a generic character corresponds to the predication or membership relation of Western logic. We say, for instance, 'It is a pot', which means 'It is a member of the class of pots.' Navya-Nyāya uses the same expression 'It is a pot' ((*ayaṃ*) *ghataḥ*) in the sense of 'It is a locus of potness' (*ghaṭa-tvavān*). Any generic character is conceived as a unit class (*eka-vyakti*), i.e. a class which contains a single member (individual). A class containing several members (individuals) is called *nānā-vyakti*; e.g. fire is *nānā-vyakti*, since we have mountain fire, kitchen fire etc..

The names of particular qualification relation (*viśeṣaṇatā-viśeṣa-saṃbandha*) and peculiar relation (*svarūpa-saṃbandha*) are given to an infinite number of relations sui generis, of which the main types are:

(a) the relation by which a character peculiar to one individual resides in the individual qualified by it, e.g. the relation of Devadattaness to Devadatta;

(b) the relation by which a compound property (which is no generic character) resides in the subject qualified by it, e.g. the relation of beastness (whose parts are hairiness and tailedness) to beast;

(c) the relation by which an abstract of a generic character resides in the generic character qualified by it, e.g. the relation of potness-ness to potness;

(d) the relation by which a relational abstract resides in the subject qualified by it, e.g. the relation of locusness to locus;

(e) the relation by which a universal-positive property resides in all things; properties such as nameableness and knowableness are called universal-positives (*kevalânvayin*); they are attributes of the universe of discourse, since everything is nameable, and is knowable;

(f) the relation of an absence to its locus.[4]

The particular qualification by certain abstracts corresponds, like the inherence of generic characters, to the predication of Western logic. E.g. 'It has knowableness' means the same as 'It is knowable'.

[3] There are seven categories (*padārtha*): substance, quality, action, generic character, ultimate difference, inherence, absence. Cf. Ingalls, pp. 37–8.

[4] This will be considered in § 3.

§ 2. *Relations which are non occurrence-exacting*

Only those non occurrence-exacting relations which are logically important in Navya-Nyāya will be considered here. They are, with the exception of the relation of identity, in a sense indirect relations, since they exist between certain attributes because of the loci to which these attributes are related.

If two attributes occur in the same locus, they are related to each other by the relation of community of locus (*sāmānādhikaraṇya*). Community of locus is ambiguous since it may mean (a) that the two attributes have exactly the same locus or loci, i.e. locus of the one attribute is coextensive with locus of the other attribute, or (b) that all locus of one attribute falls within the loci of the other attribute, or (c) that the two attributes have at least one locus in common. (a) implies (b); (a) and (b) imply (c). (a) is reciprocal pervasion, (b) is pervasion, and (c) is what is usually called -*sāmānādhikaraṇya*, which may be translated by 'having a common locus with-', 'having a locus in common with-' or 'sharing a locus with-'. Community of locus in sense (c) is symmetric; it exists, for instance, between smoke[5] and fire or between fire and smoke, because there is smoke in a locus of fire and fire in a locus of smoke, and between potness and substanceness or between substanceness and potness, because there is a pot which is a substance and a substance which is a pot. This community of locus is either (1) pervasion or (2) deviation, since either (1) every locus of the first attribute is a locus of the second attribute or (2) not every locus of the first attribute is a locus of the second attribute, which can only mean that some locus of the first attribute is a locus of the second attribute and some is not.

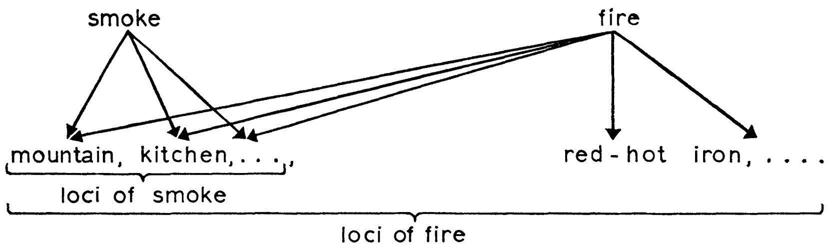
There is pervasion (*vyāpti*) of A by B if and only if every locus of A is a locus of B. 'Every locus of A is a locus of B' must be interpreted as meaning 'There is a locus of A, and if anything is a locus of A, it is a locus of B.' Now this is the case when A is necessarily accompanied by B, i.e. when B is an inseparable concomitant of A. Thus pervasion is invariable concomitance. The subject of pervasion is the pervaded thing (*vyāpya*), denoted by A (hence the relation is also called *vyāpyatva*, pervadedness); the term of pervasion is the pervader (*vyāpaka*), denoted by B (hence invariable concomitance is strictly speaking *vyāpakatva* (pervaderness),

[5] We always name the subject of the relation first.

the converse of pervasion or pervadedness). The relation of pervasion is transitive, since if every locus of A is a locus of B and every locus of B is a locus of C, every locus of A will be a locus of C. It is reflexive, because every attribute can be said to have for its locus its own locus. The typical example of pervasion is that of smoke and fire. Smoke is pervaded by fire: wherever there is smoke there is fire, i.e. every locus of smoke is a locus of fire. If the two attributes between which pervasion exists are generic characters or similar abstracts, pervasion corresponds to the inclusion of classes. This is made clear by an example such as 'Wherever there is potness there is substanceness', i.e. 'Every locus of potness is a locus of substanceness', which expresses the same as 'All pots are substances', since the loci of potness are the pots and those of substanceness the substances.

Deviation (*vyabhicāra*) is contrary to pervasion. There is deviation of A from B if and only if some locus of A is a locus of B and some is not. Fire deviates from smoke because fire occurs not only in mountain, kitchen and other loci of smoke but also in red-hot iron, which is no locus of smoke. The subject of deviation is the deviating thing (*vyabhicārin* or *vyabhicarita*). Thus fire is the subject of deviation from smoke.

Pervasion of smoke by fire and deviation of fire from smoke may be illustrated by the following diagram:



A non occurrence-exacting relation whose terms are immediately related as attribute to locus is the relation of identity (*tādātmya*). Both the attribute and the locus are individuals (cf. p. 4). There is a locus of fire (e.g. mountain) which is identical with a locus of smoke. Here a locus of fire is related as attribute to a locus of smoke, which is, by the relation of identity, a locus of a locus of fire. The relation of identity is considered to be non occurrence-exacting because a thing does not occur in itself.

§ 3. *Absence and incomplete occurrence*

Relations being the material of Navya-nyāya logic, negation is to apply here to relations. What is capable of being negated is the existence of a certain relation between certain things. In negating this one negates the presence of a certain attribute, somewhere and by a certain relation. Negation, then, amounts to stating an absence of a thing somewhere. The absent thing is the adjunct (*pratiyogin*) of an absence (*abhāva*), for it is related by an absence; we call it the counterpositive[6] of an absence. The locus of an absence is that from which the counterpositive is absent. Any absence occurs in its locus by a particular qualification relation (or peculiar relation, p. 5).

Navya-nyāya logic uses two types of absence: (I) mutual absence (*anyonyâbhāva*) or difference (*bheda*), by which the relation of identity is denied, and (II) constant absence (*atyantâbhāva* or simply *abhāva*), by which a relation other than that of identity is denied.

Examples of (I) are: (1) 'There is a mutual absence of mountain in a kitchen'. This is usually expressed in the form 'A kitchen possesses (=is a locus of) mutual absence of mountain', or '[A] kitchen is different from [a] mountain'[7], i.e. 'A kitchen is no mountain.' The counterpositive of this absence is mountain, the locus kitchen. (2) 'There is a mutual absence of locus of fire in a lake'. This is also expressed in the form 'A lake possesses (=is a locus of) a mutual absence of locus of fire', or '[A] lake is different from [a] locus of fire', i.e. 'A lake is no locus of fire.' The counterpositive of this absence is locus of fire, the locus is lake. Instead of 'different from-' (*-bhinna*) we often find 'other than-' (*-anya*).

Examples of (II) are: (1) 'There is a constant absence of fire in a lake'. This is usually expressed in the form 'A lake possesses (=is a locus of) a constant absence of fire.' We say 'There is no fire in a lake.' The counterpositive of this absence is fire, the locus lake. The relation denied is contact. (2) 'There is a constant absence of fire in particles of smoke.' Another way of expressing this is: 'Particles of smoke possess (=are loci of) constant absence of fire.' We say 'There is no fire in particles of smoke'. The counterpositive of this absence is fire, its locus particles of smoke. The relation denied is inherence. (3) 'There is a constant absence of fire in a

[6] This is another translation of *pratiyogin*.

[7] Like Latin, Sanskrit has no article. English often uses the indefinite article here.

locus of smoke', i.e. 'There is no fire in a locus of smoke'. This statement is true if the relation denied is inherence and locus of smoke is a locus by inherence or contact; it is false if the relation denied is contact and locus of smoke is a locus by contact.

For every constant absence there is a corresponding mutual absence. If there is no fire in a lake, then a lake is no locus of fire, and vice versa.

The negation of a logical term may be formed in the usual way, viz. by prefixing non (*a*(*n*)) to the noun. Examples: non-counterpositive (*apratiyogin*), non-locus (*anadhikaraṇa*), non-occurrence (*avṛttitva*), non-pervasion (*avyāpti*).

Negation is contradictory to the thing negated, otherwise it would be no negation. Accordingly an absence must contradict a presence in respect of the same locus. Absence of fire in the kitchen is indeed contradictory to presence of fire in the kitchen, for either there is fire in the kitchen or there is not. Navya-Nyāya admits, however, one case in which presence and absence of the same thing are not contradictories, but coexist in the same locus. This exceptional case is that of contact as inhering in a substance. Contact, which gives rise to the relation of contact, is a quality (*guṇa*); it occurs by inherence in all substances, for every substance is in contact with some other substance. The occurrence of contact is incomplete, since it is always limited to a part of a substance. Thus contact occurs in a part of its locus and does not occur in another part. The typical example of it is the contact with a monkey, which occurs in the tree. The branches of the tree are in contact with the monkey, but the roots are not; the tree is both a locus of contact with a monkey and a locus of absence of contact with a monkey. Contact, therefore, is of incomplete occurrence (*avyāpya-vṛtti*[8]), and so is its absence when occurring in substances. Absence of contact, however, occurs in all things (it is universal-positive, p. 5). In things other than substances (e.g. qualities, actions) it is contradictory to presence of contact, for there it does not share its locus with contact, which occurs only in substances. Then it is of complete occurrence (*vyāpya-vṛtti*[9]). Is there really one absence of contact occurring in all things, or are there two distinct absences of con-

[8] = *avyāpya vartate* (cf. N.S., p. 134, line 9). The first member of the compound is the negative prefix *a* + a gerund in *-ya*. *Vy-āp-* is evidently not used here in the technical sense of *vyāpti* (relation of pervasion).
[9] = *vyāpya vartate*. Cf. preceding note.

tact, the one occurring in things other than substance and excluding, as a genuine absence does, its counterpositive from its locus, the other occurring in all things and capable of sharing its locus with its counterpositive? The answer to this question is given in Gaṅgeśa's Theory of pervasion[10].

§ 4. *Definition*[11]

By definition (*lakṣaṇa*) Navya-nyāya means a characterization of a thing; the thing may be a nature (species, genus) or a state of affairs. The given characteristic (*lakṣaṇa*) must be peculiar to what is characterized (*lakṣya*). Thus a correct definition of cow is 'having a dewlap', because cattle have a dewlap and it is only cattle that have it. If cow is characterized by 'having horns' the definition will be too wide, for there are horned beasts which are no cattle. Navya-nyāya expresses this by saying that the definition suffers from the fault of overpervasion (*ativyāpti*). On the other hand, the definition will be too narrow if we use 'having a black colour' to characterize cow; for some cattle are not black beasts. Then our definition is said to suffer from the fault of nonpervasion (*avyāpti*). Finally, if a definition does not apply to any individual of the definitum, Navya-nyāya speaks of impossibility (*asaṃbhava*) of the definition; this happens when cow is characterized by 'having an uncloven hoof'; for cattle are cloven-hoofed. If the thing to be defined is the relation of pervasion (*vyāpti*), which expresses a state of affairs, the correctness of the definition depends on its applicability to all cases of pervasion and on its inapplicability to all cases where the state of affairs is not pervasion. Now pervasion essentially belongs, as we shall see, to a true inference. It follows that a correct definition of it will apply in all cases of true inference and will not apply in any case of false inference. Thus a definition of pervasion which fails to apply in a true inference suffers from the fault of nonpervasion, and a definition of pervasion which also applies in a false inference suffers from the fault of overpervasion.

A further requirement for a correct definition is that the definitum should by no means be introduced into the definition; for it is necessary that we avoid a circulus in definiendo, which is called *ātmâśraya* (foundation upon the thing itself).

10 T.C. 72.2–4.
11 Cf. Foucher, pp. 8–10, and Staal, The theory of definition in Indian logic.

§ 5. *Inference*

Logic can be characterized as a theory of inference. This is true not only of Western logic but also of Indian logic if we consider its formal aspect; it turns on inference and its parts. It is not surprising, therefore, that the same word, *nyāya*, is used as a technical name for logic and for syllogism.

Like ancient Greek logic Indian logic takes syllogism as the prototype of inference. The Indian syllogism is expressed in two forms: an elaborate form, which is the so-called five-membered syllogism, and a concise form, which is a kind of enthymeme. We shall not concern ourselves with the first form[12], since in practice the second form is the usual one. Inference (*anumāna*), then, is thus exemplified: The mountain has fire because of smoke (*parvato vahnimān dhūmāt*). I.e. the mountain has fire because it has smoke; i.e. the mountain is a locus of fire because it is a locus of smoke. The syllogistic form implied in it may be expressed as follows: Every locus of smoke is a locus of fire, The mountain is a locus of smoke, Therefore the mountain is a locus of fire. This falls under the schema:

$$\frac{\begin{array}{l}\text{Every locus of A is a locus of B}\\ \text{P is a locus of A}\end{array}}{\text{P is a locus of B}} \quad .$$

P is called *pakṣa*, which we translate by *subject* (of the conclusion). B is called *sādhya*, which means *probandum*, i.e. the attribute to be proved of P. A is called *hetu*, which means *reason*, i.e. the reason for B's belonging to P. A is also called *sādhana*, which means *probans*. P is usually unspecified in the instances of inference. The common form of inference is, e.g., (1) It has fire because it has smoke (*vahnimān dhūmāt*), or (2) It is a substance because it has earthness (it is earth) (*dravyaṃ pṛthivītvāt*). In (1) fire (*vahni*) is B, smoke (*dhūma*) A; in (2) substanceness (*dravyatva*, cf. p. 5) is B, earthness (*pṛthivītva*) A. The truth of such inferences depends on the truth of the major premiss, which expresses a pervasion (*vyāpti*) of A by B. The minor premiss expresses the possession of A by P; this is called *pakṣa-dharmatā*, i.e. the fact that A is one of the attributes of P. By combining P's possessing A with B's pervading A we naturally get the conclusion (*anumiti*) 'P possesses B.' Navya-nyāya expresses the conjunc-

[12] For the five-membered syllogism (*nyāya*) see Ingalls, p. 33, and Keith, pp. 123–5.

tion of minor and major premiss, which is the cause of inference, by saying 'P possesses A, which is pervaded by B.' E.g., the mountain possesses smoke, which is pervaded by fire (*vahni-vyāpya-dhūmavān parvataḥ*). This is the verbal expression of what is called the consideration of a sign (*liṅga--parāmarśa*). A is the sign of B; e.g. smoke is the sign of fire.

§ 6. *Quantifiers and limitors*

Navya-nyāya logic has a predominantly intensional character. This explains why little use is made of quantifiers. The words used as universal quantifiers (existential or particular quantifiers do not occur) are: *sakala* (all, every), *yāvat* (as much as, all that is-, all) and *yatkiṃcid* (whatever, no matter which). They indicate that the whole extent of the attribute or locus to which they are attached must be taken into account. Sometimes they seem to let in the ambiguity they are expected to remove. This is due to the fact that they always occur in compounds the analysis of which can easily lead to various, and often unnatural, interpretations. For instance, the phrase *sakala-sādhyavad-anyâvṛttitva* (non-occurrence [of the reason] in what is other than every locus of the probandum)[13], which is given as a definition of pervasion, might be interpreted to mean that it is not true of every locus of the probandum that the reason occurs in something different from it. But on this interpretation the phrase does not express a correct definition of pervasion, since we can say that in the case of the pervasion of smoke by fire it is obviously true of every locus of fire (probandum) that smoke (reason) occurs in something different from it (smoke occurs on the mountain, which is different from the kitchen, the first locus of fire; smoke occurs in the kitchen, which is different from the mountain, the second locus of fire; etc.). The whole point is that in the interpretation the sense of the phrase is vitiated by a wrong distribution of the quantified term.

To indicate that a thing which appears as a relational element represents the nature of the class denoted by its name, Navya-nyāya logic adopts a special procedure which is as follows. The abstract of a relational element (which may be called a relational abstract) is said to be limited (*avacchinna*) by the abstract (i.e. the class character) of a thing, which

[13] T.C. 91.1.

second abstract is said to be the limitor (*avacchedaka*) of the first abstract, if and only if the general nature of the thing, i.e. the thing as the universal present in the individuals, is that which appears as the relational element. Relational elements are, e.g., locus and superstratum, absence and counterpositive, probans and probandum. The corresponding relational abstracts are locusness, superstratumness etc.. Take counterpositiveness (*pratiyogitā*). Counterpositiveness to an absence is limited by the class character of a thing, and this class character is the limitor of the counterpositiveness to that absence, if and only if the general nature of the thing appears as the counterpositive of that absence. Now a general nature A is absent only if all individual A's are absent. It follows that if the general nature of a thing functions as the counterpositive of an absence, the thing will be absent in its whole extent, i.e. the thing qua class will be absent. Let the counterpositive be water. Waterness, the class character of water, is the limitor of the counterpositiveness to absence of water if and only if the class of waters is absent.

Limitors are also used in connexion with such abstracts as -*saṃbandhitā* (being connected with-) and -*sāmānādhikaraṇya* (having a common locus with-, p. 6), and with *saṃbandha* (relation, connexion), which is treated as identical with *saṃbandhitā*. These abstracts are properties belonging to the subject of a connexion. Now these properties are limited by the class character of the subject if and only if the connexion belongs to the subject by the very nature of the subject. Thus the connexion of smoke with fire (which is a pervasion) is limited by the limitor smokeness, because the connexion with fire belongs to smoke by the nature of smoke; there is no smoke without fire. But the connexion of fire with smoke is not limited by fireness, because it is not in virtue of the nature of fire that fire is connected with smoke; there is fire without smoke.

The word *avacchinna* (limited, determined) is used not only of a relational abstract which is limited by the class character of what appears as the relational element or subject, but also of a thing's nature which is determined by the class character of the thing. In the latter case we shall translate *avacchinna* by 'determined'. The nature determined by the class character of a thing is the forma cum subjecto represented by the concrete concept of the thing; the class character is the forma sine subjecto represented by the abstract concept of the thing. E.g., water, the nature of all waters, which is determined by waterness, is the forma

cum subjecto represented by the concrete concept 'water'; waterness, the class character of water, is the forma sine subjecto represented by the abstract concept 'waterness'. Both formae are denoted by the neuter *sāmānya*, which means 'universality, universal nature.' The two technical senses of *avacchinna* can be clearly distinguished in the following expressions: (a) *sādhyatâvacchedakâvacchinna-pratiyogitākâbhāva*[14], which we translate 'an absence the counterpositiveness to which is limited by the limitor of the probandumness', (b) *atyantâbhāva-pratiyogitâvacchedakâvacchinna*[15], which we translate 'what is determined by the limitor of the counterpositiveness to a constant absence.' In (a) we have a counterpositiveness *limited* by the class character which limits the probandumness, in (b) a general nature *determined* by the class character which limits the counterpositiveness.

In a different and less technical sense we find *avacchinna* used in the phrase *sādhanâvacchinna-sādhya* (the probandum limited, i.e. restricted, by the probans)[16]. The meaning of the phrase is: the probandum in so far as it occurs in loci of the probans.

§ 7. *Accident*

All concomitance must have a cause. If an attribute B is an inseparable concomitant of an attribute A, in other words, if A is pervaded by B, then the cause of B's being a concomitant of A will be the nature of A, because A is universally connected with B. On the other hand, if B is a separable concomitant of A, so that A can be without B, which means that A deviates from B, then the cause of B's being a concomitant of A will be something different from A, which brings about the connexion of A with B. This thing, which is a necessary condition for B's being a concomitant of A, is called *upādhi*[17]. We give it the name of accident[18]. An example of an accident is wet fuel in the inference 'It has smoke because it has fire (with wet fuel)'[19]. Wet fuel is a necessary condition if fire is to be accom-

[14] T.C. 53.5–54.1.
[15] T.C. 100.3.
[16] T.C. 165.5.
[17] This sense of *upādhi* differs from the sense in which it means 'imposed property' (Ingalls, pp. 40, 78).
[18] Cf. Foucher, p. 32.
[19] Fire is taken as probans. Without the bracketed part the inference will be false.

panied by smoke; without wet fuel there is no fire with smoke. And wet fuel is 'accidental' to fire, because fire occurs in places (e.g. red-hot iron) where no wet fuel is found. Let fire be A, smoke B and wet fuel C. Then we have the following state of affairs.

(1) If A and C, then B.

(2) If A and B, then C.

From (2) it follows that C is a necessary condition for B's being a concomitant of A; for (2) is equivalent to (3): If no C, then if A, no B. In his Theory of accident[20] Gaṅgeśa describes this situation correctly by defining *upādhi* as follows: *yad-vyabhicāritvena sādhanasya sādhya-vyabhicāritvaṃ sa upādhiḥ*, which means 'accident is that from which the probans deviates if and only if the probans deviates from the probandum', i.e. A deviates from C if and only if A deviates from B. Deviation of A from C is the fact that we have A and no C; deviation of A from B the fact that we have A and no B. Thus Gaṅgeśa's formula is: (4) If A and no C, then A and no B, and (5) If A and no B, then A and no C. (4) is equivalent to (2), and (5) is equivalent to (1).

The above situation occurs also in the other cases which are given as examples of an inference with an accident. One of these cases is: He is black because he is a son of Mitrā (who eats vegetables). Here the accident is 'eating vegetables'. Any son of a woman called Mitrā is black if he has been conceived at a time when she ate vegetables; but the sons that were conceived while she ate no vegetables but drank milk are fair-complexioned.

[20] T.C. 336.2–3.

CHAPTER II

GAṄGEŚA'S THEORY OF PERVASION

§ 8. *Gaṅgeśa, the author of the Tattvacintāmaṇi*

The Tattvacintāmaṇi is Gaṅgeśa's only important work.

Gaṅgeśa, whose full name is Gaṅgeśopādhyāya, lived in the fourteenth century[1]. It is very likely that he was born in the province of Mithilā. Mithilā remained for more than two centuries the centre of study of Gaṅgeśa's work. Afterwards this centre was transferred to Navadvīpa (in Bengal), where large numbers of commentaries and subcommentaries were written on the Tattvacintāmaṇi, in particular on the part dealing with inference. Gradually Gaṅgeśa's work became known throughout India. Its influence can be traced in the works of almost all the branches of Sanskrit learning of the last five centuries.

Gaṅgeśa owes his success to the originality of his method, the simplicity of his style, the scientific character of his terminology. His method results in a systematic treatment of one subject, viz. the doctrine of knowledge. His style does not suffer from the excess of terseness of aphorisms (sūtras). His terminology displays the development of a system of highly technical expressions. So far his merits. A demerit is that in a discussion of a topic he is not free from the habit, inherent in any eristic logic, of trying at all costs to refute the opponent one is attacking. He sometimes uses against an opponent an argument which he rejects afterwards when proving his own point. In this respect he follows a general practice of the school, where victory in debate plays a large part.

§ 9. *The Anumitinirūpaṇa and Vyāptivāda as sections of the Book on inference*

Gaṅgeśa's *anumiti-nirūpaṇa* and *vyāpti-vāda*, in which he discusses inference and pervasion, form the first two sections of the second book of his

[1] For the date of Gaṅgeśa and other biographical details cf. Bhattacharya, D., pp. 97–104, and Satischandra, pp. 405–7.

Tattvacintāmaṇi. The *tattva-cintā-maṇi* ('thought-gem of truth') consists of four books, each of which is concerned with a different means of knowledge. For Gaṅgeśa admits four means of valid knowledge (*pramāṇa*): perception (*pratyakṣa*), inference (*anumāna*), identification (*upamāna*), and word or verbal testimony (*śabda*). Perception includes pure sense-perception and a kind of intuition which grasps general natures and principles. Inference is the inferential process of syllogism and similar reasoning. Identification is the identification of something unknown through its similarity to something already known. Word or verbal testimony produces verbal knowledge which derives its validity from the authority of verbal testimony.

The second book, then, of the Tattvacintāmaṇi is the Book on inference (*anumāna-khaṇḍa*). Its first section, the *anumiti-nirūpaṇa*[2], consists of general observations about inference and its validity, and starts with a definition of conclusion. In this definition the term 'pervasion' is used. So to understand what a conclusion is we must first know what 'pervasion' means. The next section, therefore, is a theory of pervasion (*vyāpti-vada*); it gives a full account of the definitions of pervasion.

§ 10. *The Theory of pervasion*

Gaṅgeśa's object in the *vyāpti-vāda* is to give a correct definition of pervasion. In accordance with the procedure commonly adopted by Navya-nyāya in the treatment of a topic, Gaṅgeśa first passes under review the definitions of pervasion which were current in his time, but which he rejects for several reasons, and then proceeds to provide definitions of pervasion which in his view are correct. The definitions he criticizes occur in three chapters, of which only the last bears the technical name *pūrva-pakṣa*, i.e. the refutation of objections[3] which precedes the conclusion (*siddhānta*); but that name could also have been given to chapters I and II, all definitions of the three chapters being equally subject to refutation. The reason why the use of *purva-pakṣa* is restricted to chapter IV might well be that chapter I and II are separated from chapter IV by a chapter dealing not with definitions of pervasion but with an epistemological

[2] It means literally 'consideration of conclusion.'
[3] The objections are here in the form of definitions of pervasion put forward by opponents.

question raised on account of the definitions given in chapters I and II. The definitions occurring in chapter I are five definitions of non-deviation, with which pervasion may be identified. Chapter II contains two definitions of the teachers 'Lion' and 'Tiger', being of the same logical form as the first five. The seven definitions are rejected by Gaṅgeśa on the ground that they fail to apply in the case of a universal-positive inference[4]. They suffer from the fault of unexampled term, because we cannot find a locus of absence of the probandum when the probandum is universal-positive. An absence without a locus is an absence which does not exist, and a definition which must appeal to such an absence is useless. There were nevertheless people who argued that an absence-of-the-probandum with a locus is conceivable even in the case of universal-positives. Their argument is refuted in chapter III. In chapter IV Gaṅgeśa passes to the other definitions of pervasion. The first definition, definition (8)[5], is a refinement of definition (6). Definitions (9) and (10) present a new formulation of the type 'non-deviation'. Definition (11) is a more complicated variety of the same form. Next follows a pair of definitions in which pervasion is formulated as a negation of the common definition of accident. The last group are definitions which define pervasion positively as a connexion between probans and probandum; the connexion is characterized in different ways. An exception to this seems to be definition (19), which is interpreted as a variant of definition (1). The last definition, definition (21), is a combination of definitions (20) and (5). Apart from other considerations which are different for each kind of definition and chiefly have a ground in the ambiguity of some formulations, Gaṅgeśa condemns the whole series of the definitions under criticism by noticing that they all use, explicitly or implicitly, the terms 'probans' and 'probandum'; the use of these terms, he says, involves circularity, since the notions of probans and probandum can be understood only with the help of the notion of pervasion. Having pointed out the necessity of defining pervasion, he states, in chapter V, his own definition of pervasion, which is the conclusive definition (*siddhānta-lakṣaṇa*). This definition, which is formally like definition (9), differs from the preceding definitions in two respects: (a) the terms 'probans' and 'probandum' are replaced by relative and demonstrative pronouns, which clearly function as variables, and (b)

[4] An inference with a universal-positive probandum is called universal-positive.
[5] I have numbered the definitions.

the term 'limitor' is introduced to indicate that the thing referred to does not stand for a particular instance, but for the class denoted by its name. But since here the use of 'limitor', in reference to the counterpositive of an absence, presupposes the admission of a universal absence[6], Gaṅgeśa proceeds in chapter VI to explain the purport of a universal absence. That the assumption of such an absence is no precondition of the definition of pervasion, he shows in chapter VII by giving first three correct definitions of pervasion in which the terms are treated as sets of particulars. These definitions are still of the same logical type as the conclusive definition. He turns then to consider questions relative to all or some of his definitions, inter alia the question how a constant absence should be qualified in order to be contradictory and why a mutual absence does not need this qualification. He next offers three definitions similar to definitions (12) and (13), in which pervasion is defined as a relation without an accident. Finally, he passes to the type of definition which describes pervasion as a positive connexion between attributes. This connexion is characterized by the fact that it is limited by the class character of its subject. The remainder of the chapter contains three corollaries[7] about the nature of accident, drawn from the statement that a connexion whose subject has an accident is limited by the accident.

§ 11. *The types of definition of pervasion*

Pervasion is a community of locus (*sāmānādhikaraṇya*, § 2). This community, when not explicitly mentioned in a definition of pervasion, must be assumed as implied by the fact that the terms of pervasion are supposed to be terms of inference. For inference is not conceivable without some common locus connecting the terms. The question to be answered therefore is: what kind of community of locus is pervasion? Or, how to define that community of locus which we call pervasion? We know community of locus to be either pervasion or deviation. It follows that pervasion is definable either as a form of community of locus or as non-deviation. Since a deviation involves an accident, and vice versa (§ 7), non-deviation

[6] A universal absence is an absence whose counterpositive is a 'universal' (§ 6).
[7] In the T.C. (165.1) the final section of chapter VII is entitled 'The four *ata eva*'s' (*ata eva catuṣṭayam*), because the phrase *ata eva* ('that is why') occurs four times in it. But the third *ata eva* does not introduce a new corollary; we have only three corollaries.

can be identified with community of locus without an accident. So we have three manners of defining pervasion: (I) as non-deviation, (II) as the negation of an accident and (III) as a special form of community of locus.

(I). Non-deviation is the negation of deviation. Deviation of A from B is the fact that some locus of A is a locus of B and some is not (§ 2). The component statement 'some locus of A is a locus of B' can be left out of account since, as was explained above, such a community of locus is always supposed to be the case. Deviation of A from B can therefore be said to be the fact that some locus of A is not a locus of B, i.e. (1) there is something which is a locus of A but not a locus of B. The same is conveyed by saying: (2) there is something which is not a locus of B but a locus of A.

(1) may be expressed as (a) 'A (=probans) occurs in a locus of (constant) absence of B (=probandum)', or (using the corresponding mutual absence) as (b) 'A occurs in a locus other than locus of B,' or as (c) 'a locus of A is a non-locus of B.' The negation of (a) is definition (1) of pervasion, that of (b) is definition (5), and that of (c) is found in definitions (6) and (7). Definition (2) is a refinement of definition (1), definition (3) a verbal variant of definition (5), and definition (4) a logical variant of definition (1). Definition (8) is a refinement of definition (6), and definition (19) a verbal variant of definition (1).

(2) may be expressed as (a) 'B is absent from a locus of A', i.e. 'B is the counterpositive of a constant absence having a common locus with A', or (using the corresponding mutual absence) as (b) 'locus of B is the counterpositive of a mutual absence having a common locus with A (residing in a locus of A). The negation of (a) is definition (9), and, with a refinement, definition (23). The negation of (b) is both definition (10) and definitions (24) and (25). The conclusive definition, definition (22), is a variety of definition (23). All these definitions mention explicitly the community-of-locus of A with B, and evidently do so because otherwise A would not be stated as the subject of pervasion, B or locus of B being the subject of the negation of deviation[8].

(II). The negation of an accident is the negation of a definition of acci-

[8] Here we have, strictly speaking, not the negation of deviation, but the negation of the converse of deviation. Hence the definitions falling under (2) are not classed among the definitions of non-deviation (*avyabhicaritatva*), though they are of the type 'non-deviation'.

dent. There are several definitions of accident; the definition which is used here is the common definition which describes accident incompletely as an attribute pervading the probandum without pervading the probans. If an attribute which pervades a probandum B does not pervade the corresponding probans A, then B itself does not pervade A, i.e. A deviates from B. And if A deviates from B, we can imagine an attribute (whose locus may be coextensive with locus of B) from which A deviates, i.e. which does not pervade A, and which pervades B. Thus deviation is equivalent to the definition of accident, and pervasion is the negation of that definition. This negation can be formulated in two ways: (a) No attribute that pervades (is a pervader of) B does not pervade (is no pervader of) A, i.e. Any attribute that pervades B pervades A; (b) No attribute that does not pervade (is no pervader of) A pervades (is a pervader of) B, i.e. Any attribute that does not pervade A does not pervade B. Both the formulations (a) and (b) are found in definition (12) of pervasion. Formulation (a) is adopted by definitions (13) and (28), formulation (b) by definitions (26) and (27). Since the formulations use 'pervader of' or 'pervading', the definitions would beg the question if they were not either defining pervaderness (definition (12)) or replacing 'pervading' and 'not pervading' by synonymous expressions (definitions (13), (26), (27) and (28)).

(III). The special form of community of locus is a relation which has for its domain the subject (=probans) class. This characteristic of the relation of pervasion is correctly expressed by definitions (14) and (29). Definition (18) may be interpreted in the same way. Definitions (15) and (16) add a wrong qualification to the connexion which consists in community of locus, and definition (20) gives no qualification at all.

There remain the definitions (11), (17) and (21). Definition (21) is a combination of definitions (20) and (5). Definition (17) deals with a community of locus which connects the probandum indirectly with the whole of the probans by connecting it with all the attributes that have a common locus with the probans. Its parallel in the type 'non-deviation' is definition (11). The number of definitions of pervasion amounts to twenty-nine.

§ 12. *The formal character of Gaṅgeśa's definitions of pervasion*

The most interesting feature of Gaṅgeśa's theory of pervasion is his disapproval of the terms 'probans' and 'probandum' as elements in a defi-

nition of pervasion. He suppresses these terms or replaces them by relative and demonstrative pronouns. In doing so he contributes to the formalization of the logical language used to define pervasion. Pronouns denoting variables are already found in the definition of pervaderness (*vyāpakatva*), which is part of definition (12) of pervasion. But a systematic use of them begins only at Gaṅgeśa's own conclusive definition (definition (22)). This definition and the subsequent definitions of pervasion have a formal character inasmuch as they contain constants and variables. In particular definitions (22–25), which formulate pervasion briefly and unambiguously (which the remaining definitions do not do), may serve as examples of a logical structure which embodies the correct application of well-known constants to variables. For the sake of simplicity we shall confine ourselves to definitions (23), (24) and (25).

Definition (23) defines *vyāpti* as *pratiyogi-vyadhikaraṇa-sva-samānâdhikaraṇâtyantâbhāvâpratiyoginā sāmānādhikaraṇyam*[9]. As constants we may regard the following elements in the definition:

adhikaraṇa, locus. 'Being a locus of' is a relation. It is triadic, because it holds between three elements (variables); for we have (1) a thing that is a locus of (2) another thing (the superstratum) by means of (3) a relation (contact or inherence etc.).

samāna in connexion with *adhikaraṇa*. *samānâdhikaraṇa*, sharing a locus with, expresses a conjunction of the form 'there is a locus both of the thing and of another thing, which are related to it by their respective relations.'

vyadhikaraṇa, differing in locus from. This is the negation of *samānâdhikaraṇa*.

atyantâbhāva, constant absence. This is the negation of the presence of a thing standing in a relation (contact, inherence etc.).

pratiyogin in connexion with *atyantâbhāva* qualified by *pratiyogi-vyadhikaraṇa*. *pratiyogin* is a thing (a variable) that, standing in a relation (a variable: contact, inherence etc.), is *related as counterpositive to* a constant absence. This means that no locus to which this constant absence is related (by a particular qualification relation, § 3) is a locus of that thing standing in that relation.

a- prefixed to *pratiyogin*. *atyantâbhāvâpratiyogin* is a thing (a variable)

[9] T.C. 130.2–3. Translation on p. 119.

that standing in a relation (a variable: contact, inherence etc.) is *not* related as counterpositive to a constant absence.

Definition (24) formulates *vyāpti* as *yat-samānâdhikaraṇânyonyâbhāva-pratiyogi yadvan na bhavati tena samaṃ tasya sāmānādhikaraṇyam*[10]. The constants it contains are: *samānâdhikaraṇa* (see above under definition (23)), *anyonyâbhāva* (mutual absence, diversity), *pratiyogin* (counterpositive), *-vat* in the sense of *adhikaraṇa* (see under definition (23)), *na* (not). The variables between which the relation of pervasion holds are here clearly indicated by relative and demonstrative pronouns; in definition (23) they must be supplied in thought, and the reflexive *sva* refers to one of them.

Definition (25) consists of one word: *sva-samānâdhikaraṇânyonyâbhāvâpratiyogi-yadvatkatvam*[11]. It is an abstract of a bahuvrīhi[12] with the samāsānta[13] *ka*, meaning exactly the same as definition (24). Here we see how Sanskrit language has the power of expressing complex thought most accurately in a very concise form.

§ 13. *The use of symbols for interpreting Gaṅgeśa's logic*

Gaṅgeśa's logic of pervasion is substantially a formal logic. Its means of expression may be called a technical Sanskrit; however, it is not an artificial language (as is found in Pāṇini's grammar), since it plainly reflects the pure Sanskrit idiom. Our task is to find the idiomatic equivalents in our language and to interpret the logical content in the light of Western formal logic. In accordance with the tradition of Western logic, we shall often give in addition to a verbal interpretation a symbolic representation by means of the symbols of mathematical logic which are applicable to our subject-matter. Before introducing our symbolism here, we shall, confining ourselves to inference and pervasion, show, what attempts at symbolization and formalization have already been made by scholars who, familiar with Western logic, have worked in the field of Navya-nyāya logic.

Saileswar Sen in his *Study on Mathurānātha's Tattva-cintāmaṇi-rahasya* uses the letters A, B, to denote attributes appearing as probans and prob-

[10] T.C. 130.3–131.2. Translation on pp. 119–20.
[11] T.C. 131.2–132.1. Translation on p. 120.
[12] Possessive adjective compound.
[13] Suffix attached to the end of a compound.

andum respectively, and the letters x, y, to indicate 'abodes' (loci). Absence (=constant absence) of A is symbolized by n A, reciprocal (mutual) absence of A by mA. Sen distinguishes the fact of occurrence, which he expresses by 'x contains A', symbolized by 'x;A', from the special relation such as contact, inherence etc., symbolized by 'r(x;A)'. The relation between absence of A and its locus x is represented by 'r(x:nA)', the occurrence of the absence by 'x:nA'. Pervasion of A by B is formulated '(x:A)/(x:B)', i.e. if x contains A, then x contains B. Its negative formulation is 'y:nB/y:nA', or 'y:nB/n (y:A)', i.e. if y contains the absence of B, y does not contain A. A universal quantifier is not used, but can easily be supplied in thought[14].

Ingalls, like Sen, has chosen his symbols in view of Mathurānātha's commentary on Gaṅgeśa's Vyāptipañcaka. He takes the initial letters of the terms: s for *sādhya* (probandum), h for *hetu* (reason), p for *pakṣa* (subject), c for counterpositive, l for locus. Relations are denoted by capitals: e.g. C is contact, H is inherence; but (essential) identity is symbolized by $\doteq$. Constant absence and mutual absence are symbolized respectively by $-$ and $\dot{-}$. $\bar{P}$ denotes absential particular qualification, i.e. the particular qualification relation between an absence and its locus. Abstracts are indicated by adding numbers as subscripts (a use which Ingalls has borrowed from Sen), e.g. counterpositiveness by c_1, occurrentness by o_1, locusness-ness by l_2. Definition (1) of pervasion, then, is symbolized thus:

$$-o_1 \llcorner l - s \lrcorner \bar{P}\ h,$$ [15]

i.e. there is, by the relation of absential particular qualification, in the *hetu* (reason) absence of occurrentness to (=absence of occurrence in) a locus of absence of the *sādhya* (probandum). Elsewhere, in the introductory section II of his book, Ingalls uses symbols of mathematical logic (taken from Quine) when he illustrates the same type of definition by the example: 'No body of smoke occurs in any locus in which no body of fire is present.' This example is symbolized as follows:

$$(x)\,(x \in \text{class of bodies of fire} \cdot \supset (y)\,(\sim(x \text{ occurs in } y) \supset (z)$$
$$(z \in \text{class of bodies of smoke} \cdot \supset \sim(z \text{ occurs in } y))))$$ [16].

[14] Sen, pp. 49–50.
[15] Ingalls, p. 93.
[16] Ingalls, p. 60.

The symbolization does not appear to be correct. The correct formulation should be:

$$(y)\ \{(x)\ [(x \in \text{class of bodies of fire}) \supset \sim(x \text{ occurs in } y)] \supset (x)\ [(x \in \text{class of bodies of smoke}) \supset \sim(x \text{ occurs in } y)]\}.$$

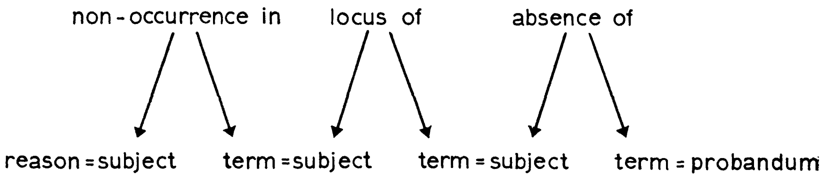
This statement is equivalent to the true statement: 'Every locus in which a body of smoke occurs is a locus in which a body of fire occurs' (i.e. all bodies of smoke occur in a locus of fire), while Ingalls' statement is equivalent to the untrue statement: 'Every locus in which a body of smoke occurs is a locus in which all bodies of fire occur.'

Bocheński, who has incorporated Indian logic in his *Formale Logik*, uses symbols of mathematical logic to interpret Gaṅgeśa's first five definitions of pervasion in terms of the logic of relations[17]. He distinguishes six binary relations: occurrence in, absence of, difference from, residence in, counterpositive of, locus of, to which he assigns the letters V, A, D, I, G, O respectively[18]. The relation of pervasion is denoted by gCs (where g represents the reason ('Grund'), s the probandum (*sādhya*)) or simply by C. Definition (1) of pervasion is formulated as follows:

$$gCs \equiv g(\dot{-}V/O/A)\, s,$$

which may be rendered thus: the reason is related by the relation of pervasion to the probandum if, and only if, the reason does not occur in a locus of absence of the probandum. The precise meaning must be: the reason is related by the relation of pervasion to the probandum if, and only if, the reason is subject of the relation of *non-occurrence in* whose term is subject of the relation of *locus of* whose term is subject of the relation of *absence of* whose term is the probandum. The following diagram may serve to illustrate this.

Relations:



[17] Bocheński, pp. 511–2.

[18] These are the initial letters of the German expressions.

Definition (2) of pervasion is a refinement of definition (1). We omit it here because Bocheński, following Ingalls' translation, adopts an interpretation which does not seem to be natural.

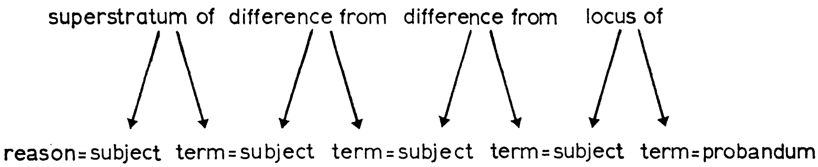
Definition (3) of pervasion is represented by the formula:

$$gCs \equiv g(\breve{O}/D/G/O)\ s.$$

Here G should be replaced by D; for 'having a different locus from that of a mutual absence whose counterpositive is a locus of s' (Ingalls' translation) means 'being the superstratum of (–rightly expressed by $\breve{O}$, the converse of O–) that which is different from that which is different from a locus of s', 'being a locus of a mutual absence whose counterpositive is a locus of s' expressing just the same as 'being different from a locus of s' (cf. § 3). Definition (3) should therefore be written:

$$gCs \equiv g(\breve{O}/D/D/O)\ s.$$

This may be illustrated by the following diagram:
Relations:



Definition (4) of pervasion, about which Bocheński says that he is not certain that he has understood it well, is formulated as follows:

$$gCs \equiv g(G/A/I/O/A)\ s.$$

But here the first A must be left out. For A in connexion with I means 'absence of what resides in', while the meaning should be 'absence which resides in'. Further, the mention of absence after 'counterpositive of' is unnecessary, since the term of the relation 'counterpositive of' can only be an absence. For G must be taken to mean 'absential counterpositive of', 'absential' referring to a constant absence. We can replace G by $\breve{A}$ (the converse of A), since if X is the absence of Y, then Y is the absential counterpositive of X, and vice versa. The letter I denoting 'residence in' can be replaced by $\breve{O}$ (the converse of O), which means 'superstratum of'.

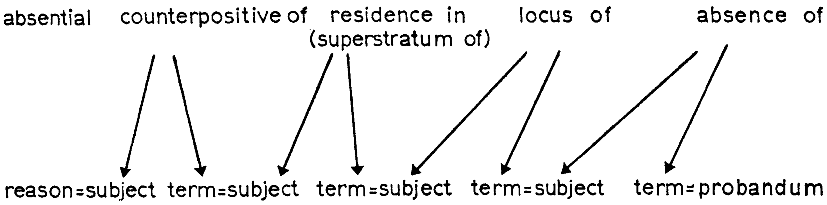
For what resides in a thing is superstratum of that thing. Thus definition (4) should take the form:

(a) $gCs \equiv g(G/I/O/A)\,s$, or

(b) $gCs \equiv g(\breve{A}/\breve{O}/O/A)\,s$,

i.e. the reason is related by the relation of pervasion to the probandum if, and only if, the reason is the absential counterpositive of what resides in (is the superstratum of) a locus of absence of the probandum. This may be illustrated as follows:

Relations:



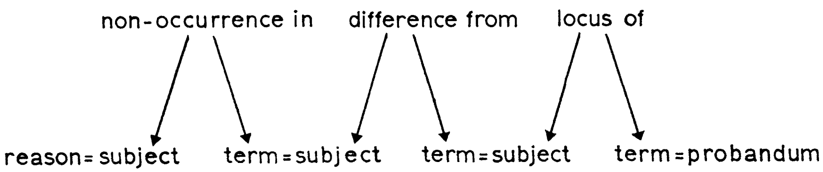
The formulation remains deficient, because what the definition says, viz. that the reason is the counterpositive of an absence which resides in *all* loci of absence of the probandum, cannot be expressed here by the use of a universal quantifier.

The last of the five definitions, definition (5) of pervasion, is represented by the formula:

$$gCs \equiv g(\dot{-}\,V/D/O)\,s,$$

i.e. the reason is related by the relation of pervasion to the probandum if, and only if, the reason does not occur in what is different from a locus of the probandum. This may be illustrated as follows:

Relations:



After having given the same formulae without the letters g and s, as identities of abstracts, Bocheński proceeds to a simplification of his sym-

bolism, which he applies to definition (1). The simplified formula of definition (1) is of the form:

$$gCs \equiv .(x) \sim (gx . \sim sx).$$

The calculus proves the equivalence of $(x) \sim (gx . \sim sx)$ to an implication of the form $(x)(gx \subset sx)$[19]. This implication expresses an inclusion of classes, i.e. the class g is included in the class s; however, these classes cannot represent the pure reason and the pure probandum, but only the reason and the probandum in so far as they stand in a certain relation. The meaning of pervasion is not that the reason is included in the probandum, but that the class of loci to which the reason is related is included in the class of loci to which the probandum is related.

Staal gives an analysis of the first and the fifth definition of pervasion in his articles *Correlations between language and logic in Indian thought* and *Formal structures in Indian logic*. Staal adopts there the symbolism of predicate calculus including equality (identity), with the use of restricted-variables as is found in the expression $\alpha F(x)$ denoting the idea 'x such that F(x)'. Two special relations are introduced: A(x, y) meaning: 'x occurs in y', 'x is present in y', and B(x, y) meaning: 'x is a locus of y', 'x has y'. Definition (1) of pervasion, then, is formulated:

$$V(h, s) =_d \sim A\{h, \alpha y B[y, \alpha x(x \neq s)]\}.$$

Here V is the relation of pervasion (*vyāpti*), h and s are variables denoting the reason (*hetu*) and the probandum (*sādhya*) respectively[20]. The meaning of the definition can be expressed as follows: the reason is related by the relation of pervasion to the probandum if, and only if, the reason is not related by the relation of occurrence-in to something that is related by the relation of locus-of to something different from the probandum, i.e. if, and only if, the reason does not occur in a locus of what is different from the probandum. The symbol of diversity, $\neq$, is used here for a relational (constant) absence; in the following definition it is more properly used to denote difference (mutual absence). Definition (5) of pervasion is formulated:

$$V(h, s) =_d \sim A\{h, \alpha y[y \neq \alpha x B(x, s)]\},$$

[19] St. Schayer uses a similar formula of implication in his explanation of Indian syllogism.

[20] Synthese, vol XII, No. 2/3, p. 281. Staal translates *sādhya* by 'conclusion'.

i.e. the reason is related by the relation of pervasion to the probandum if, and only if, the reason does not occur in something different from a locus of the probandum.

The three remaining definitions of the five are formulated by Staal in an appendix to his article *Correlations between language and logic in Indian thought*. Staal compares his formalization of the five definitions with the formalization given by Bocheński, which we have described above. The definiens of definition (2) of pervasion is represented by the formula:

$$\sim A[h, \alpha u B(u, \alpha z A\{z, \alpha y[y \neq \alpha x B(x, s)]\})],$$

i.e. the reason does not occur in a locus of what occurs in something different from a locus of the probandum. But this formula is out of keeping with the natural meaning of definition (2), which says the same as definition (1), except that it specifies the locus of absence of the probandum as a locus which is different from locus of the probandum.

The definiens of definition (3) is formulated:

$$\alpha x B(x, h) \neq \alpha y[y \neq \alpha x B(x, s)],$$

i.e. a locus of the reason is different from what is different from a locus of the probandum. 'A locus of the reason' must be taken here in the sense 'any locus of the reason'. Staal adopts Ingalls' translation of *-asāmānādhikaraṇya* 'having a different locus from that of -', which can here only have the meaning of the more literal translation 'having no common locus with-.'

Finally, the definiens of definition (4) is formulated:

$$(\alpha y B)(\sim A\{h, \alpha y B[y, \alpha x(x \neq s)]\}).$$

If (αyB) functions as universal quantifier, the meaning of the definiens will be: Whatever locus of what is different from the probandum you may select, the reason does not occur in it (is absent from it). This corresponds to the translation: the reason's being the counterpositive of an absence which resides in all loci of absence of the probandum.

In his paper *Contraposition in Indian Logic* Staal passes to formulations in terms of predicate calculus without restricted-variables. In dealing with Navya-nyāya formalism as to inference he specifies the occurrences in an inference by a formula which may serve as a definition of pervasion. He

introduces this formula as follows: 'The occurrence relation A(x, y) is always an occurrence through a relation (*saṃbandhena vṛttitva*), which relation should be specified if certain ambiguities are to be avoided. The various relations, such as *saṃyoga*, "contact" (c), *samavāya*, "inherence" (i), etc., will be written as subscripts attached to A: A_c, A_i, etc.. For instance we have A_c (smoke, hill), but on the other hand: A_i (smoke, particles of smoke). In general the occurrence in an inference may be specified, for instance as follows:

$$(x)\,(A_p(h, x) \rightarrow A_p(s, x))$$'[21].

From this it is clear that his formula contains, besides the constant A denoting occurrence, three kinds of variable: (1) x denoting loci in which attributes occur, (2) h, s denoting attributes which serve as reason and probandum respectively, and (3) the subscripts p, q denoting relations between those attributes and their loci. h and s may be replaced by constants such as smoke, fire, etc., p and q by constants such as contact, inherence, etc.. By substituting constants for these variables we get true or false statements, e.g. the true statement: Where there is smoke (through contact), there is fire (through contact)[22], and the false statements: Where there is fire (through contact), there is smoke (through contact), Where there is smoke through inherence, there is fire through inherence. Thus the relation of occurrence is seen to hold between three variables; it may be said to be triadic. The same is true of the relation 'locus of', which is generally used in Gaṅgeśa's definitions of pervasion (cf. § 12). Assuming that the relation of occurrence and the relation 'superstratum of' coincide we can say that the relation of occurrence is a converse of the relation 'locus of'.

We shall use, without any modification, the first order predicate calculus ('der engere Prädikaten kalkül' (Hilbert-Ackermann), 'uitgebreide propositielogica' (Feys)), adopting a notation which closely resembles those of Hilbert-Ackermann, Feys and Staal[23]. The use of such a calculus has two advantages. (1) It enables us to prove the logical equivalence or divergence of the definitions of pervasion. (2) We can easily distinguish, among the definitions of pervasion, the logical variants from the verbal

[21] Proceedings of the 1960 International Congress (Stanford), p. 641.
[22] In general, when we say 'there is smoke', we mean 'there is smoke through contact'.
[23] A list of symbols is given on p. 35.

variants. So we shall better understand the relation between Sanskrit expressions and logical structures.

Our starting-point is the schema of inference (§ 5):

Every locus of A is a locus of B
P is a locus of A
―――――――――――
P is a locus of B .

The validity of this schema is established by the following theorem of the predicate calculus:

(1) $\perp (z)\{[(x)(Fx \rightarrow Gx) \wedge Fz] \rightarrow Gz\}$.

'Locus of A' and 'locus of B' are values of the variables F and G respectively, and P is a value of the variable z. We write La for 'locus of A', Lb for 'locus of B' and p for P. Their substitution for the variables, respectively F, G and z, leads to the formula:

(2) $\perp [(x)(\text{La}\ x \rightarrow \text{Lb}\ x) \wedge \text{La}\ p] \rightarrow \text{Lb}\ p$.

Adding (Ex)La x to the first member of the antecedent we obtain

(3) $\perp \{[(x)(\text{La}\ x \rightarrow \text{Lb}\ x) \wedge (Ex)\ \text{La}\ x] \wedge \text{La}\ p\} \rightarrow \text{Lb}\ p$.

This means that if (a) every locus of A is a locus of B and P is a locus of A, (b) P is a locus of B. Applying the *modus ponens* we infer from the antecedent (a) the consequent (b).

The major premiss here is of the form:

(4) $(x)(\text{La}\ x \rightarrow \text{Lb}\ x) \wedge (Ex)\ \text{La}\ x$.

This expresses the pervasion of A by B: every locus of A is a locus of B. Let A be replaced by smoke, B by fire. The result is the true statement 'Every locus of smoke is a locus of fire.' In what sense is this statement true? Not in the sense that every locus of smoke is a locus of fire, whatever the relation of smoke and whatever the relation of fire. But it obviously means that every locus to which smoke is related by contact is a locus to which fire is related by contact. Otherwise the statement would be false; smoke is related by inherence to particles of smoke (cf. p. 4); particles of smoke are therefore loci of smoke (by inherence); but no particles of smoke are loci of fire, whether fire is related by contact or by inherence. That in the statement 'Every locus of smoke is a locus of fire' 'locus of

smoke' means 'locus of smoke through contact', and similarly 'locus of fire' 'locus of fire through contact', is clear from the context in which the statement is used, viz. an inference whose subject (*pakṣa*) is assumed to be for instance mountain. Thus 'locus of A' is in fact 'locus of A through R', where R is a variable standing for a relation such as 'contact with', 'inherence in', etc.. The constant 'locus of', then, turns out to be triadic; for it holds between three variables: the individual (locus) x, the predicate (class) A and the predicate (relation) R. This relationship may be expressed by Lo(x, A, R), where Lo denotes the relation 'being locus of-through'. What has been represented by La x is now represented by Lo(x, A, R). But since we adopt the first order predicate calculus, we replace Lo(x, A, R) by $(Ey)(Ay \wedge Ryx)$, to which we consider it equivalent. In other words, Lo(x, A, R), i.e. 'x is a locus of A through R', is taken to mean the same as $Ey(Ay \wedge Ryx)$, i.e. 'an A is related by R to x'. This implies that in (4) we can replace La x by $(Ey)(Ay \wedge Ryx)$, and Lb x by $(Ey)(By \wedge Syx)$. We obtain as a formula of pervasion:

$$(5) \qquad (x)[Ey(Ay \wedge Ryx) \rightarrow (Ey)(By \wedge Syx)] \wedge (Ex)(Ey)(Ay \wedge Ryx).$$

This expresses that every locus of A through R is a locus of B through S. As a rule $S = R$, but this is not necessarily the case[24]. If we substitute the constant 'smoke' for the variable A, the constant 'fire' for the variable B, and the constant 'contact' for the variables R and S, we get a true statement which expresses the pervasion of smoke by fire. It means: whatever is in contact with a body of smoke is in contact with a body of fire (cf. p. 4). The same sense is conveyed by saying: wherever there is smoke there is fire, i.e. every locus of smoke is a locus of fire.

That pervasion has existential import is expressed in (5) by $(Ex)(Ey)(Ay \wedge Ryx)$, which asserts the existence of a locus of A (cf. p. 6). If the existential import is tacitly assumed pervasion can be formulated simply as

$$(6) \qquad (x)[(Ey)(Ay \wedge Ryx) \rightarrow (Ey)(By \wedge Syx)].$$

Pervasion may be regarded as a relation between a pair of classes in the sense that one class pervades the other, in the same way as inclusion is regarded as a relation between a pair of classes in the sense that one class includes the other. E.g., 'fire pervades smoke' may be interpreted as

[24] True inferences where S is not R are found in Mathurānātha's commentary, e.g. M.36.16–37.1 (Ingalls, p. 112).

meaning that the class of fires pervades the class of smokes. If we adopt the symbolism of abstraction, we can define, in the second order predicate calculus, the relation of pervasion, Per in Per (A, B)[25], as follows:

(7) $$\text{Per} = \hat{A}\hat{B}(ER)(ES)(x)[Ey(Ay \wedge Ryx) \rightarrow (Ey)(By \wedge Syx)].$$

For the sake of completeness we shall give here our symbolic representation of the five definitions of pervasion (*vyāpti-pañcaka*)[26], whose formalizations given by Bocheński and Staal have been previously discussed.

Definitions (1), (2), (3) and (5) are stated as negations: (1), (2) and (5) as negations of occurrence in etc., (3) as a negation of community of locus with etc.. Both occurrence and community of locus are symbolically expressed in the same way, e.g. A's occurrence in a locus of B and A's community of locus with B by

(8) $$(Ex)[(Ey)(Ay \wedge Ryx) \wedge (Ey)(By \wedge Syx)].$$

A's occurrence in a locus of absence of B then is expressed by

(9) $$(Ex)[(Ey)(Ay \wedge Ryx) \wedge (y)(By \rightarrow \sim Syx)].$$

Its negation, which is the logical content of definitions (1) and (2), is expressed by

(10) $$\sim(Ex)[(Ey)(Ay \wedge Ryx) \wedge (y)(By \rightarrow \sim Syx)]$$

or by

(11) $$(y)\{Ay \rightarrow \sim(Ex)[(z)(Bz \rightarrow \sim Szx) \wedge Ryx]\}.$$

A's occurrence in what is other than locus of B and A's community of locus with a mutual absence whose counterpositive is locus of B are expressed by

(12) $$(Ex)\{(Ey)(Ay \wedge Ryx) \wedge (w)[(Ey)(By \wedge Syw) \rightarrow (x \neq w)]\}.$$

Its negation, which is the logical content of definitions (3) and (5), is expressed by

(13) $$\sim(Ex)\{(Ey)(Ay \wedge Ryx) \wedge (w)[(Ey)(By \wedge Syw) \rightarrow (x \neq w)]\}$$

or by

(14) $$(y)\{Ay \rightarrow \sim(Ex)[(w)((Ez)(Bz \wedge Szw) \rightarrow (x \neq w)) \wedge Ryx]\}.$$

[25] For this notation cf. Hilbert-Ackermann, p. 115.

[26] P. 60.

Definition (4), on the other hand, is not stated as a negation; it asserts that the reason is absent from all loci of absence of the probandum. This is expressed by

(15) $(y)\{Ay \rightarrow (x)[(z)(Bz \rightarrow \sim Szx) \rightarrow \sim Ryx]\}.$

If we compare our symbolic expressions with those of Staal (pp. 28–9), we see that our formulations of definitions (1), (2) and (5) (formulae (10) and (13)) correspond to his formulations of definitions (1) and (5), which he too formulates as negations, viz.

$$\sim A\{h, \alpha y B[y, \alpha x(x \neq s)]\},$$
$$\sim A\{h, \alpha y[y \neq \alpha x B(x, s)]\}.$$

Staal's formulation of (4), viz.

$$(\alpha y B)(\sim A\{h, \alpha y B[y, \alpha x(x \neq s)]\})$$

corresponds to

(16) $(x) \sim [Ey(Ay \wedge Ryx) \wedge (y)(By \rightarrow \sim Syx)],$

which is a variant of our formulation of (4) (formula (15)). As for definition (3) Staal's formulation does not correspond to ours, because it is based on a different translation.

That the five definitions are logically equivalent to each other and to formula (6) of pervasion can easily be proved by the calculus in which we have formulated them.

LIST OF SYMBOLS

$\sim p$	'not p'
$p \vee q$	'p or q'
$p \wedge q$	'p and q'
$p \rightarrow q$	'p implies q' ('if p then q')
$p \leftrightarrow q$	'p is equivalent to q' ('p if and only if q')
$x = w$	'x is identical with w'
$x \neq w$	'x is not identical with w'
(x)	'for all x'
(Ex)	'there is an x such that'
$\hat{x}$	'the class of all x such that'
$\perp p$	'p is logically true' ('p is a theorem')

Variables

p, q...	propositions
Ay, Bz....	individual propositions in which a predicate (class: A, B, ...) has one individual (y, z,...)
Ryx, Szw,...	individual propositions in which a predicate (relation: R, S, ...) has two individuals (y, x; z, w; ...)

Logic of classes

$\bar{A}$	'the completement of A'	Def.: $\hat{x} \sim Ax$
$A \cup B$	'the sum of A and B'	Def.: $\hat{x}(Ax \vee Bx)$
$A \cap B$	'the product of A and B'	Def.: $\hat{x}(Ax \wedge Bx)$
$A \subset B$	'A is included in B'	Def.: $(x)(Ax \rightarrow Bx)$
$A = B$	'A is identical with B'	Def.: $(x)(Ax \leftrightarrow Bx)$

ANUMITINIRŪPAṆA AND VYĀPTIVĀDA

BY

GAṄGEŚOPĀDHYĀYA

T.C. pag. 1 ॐ नमः शिवाय ।

तत्त्वचिन्तामणौ

अनुमानाख्यद्वितीयखण्डम् ।

प्रत्यक्षोपजीवकत्वात् प्रत्यक्षानन्तरं बहुवादिसम्म-
तत्वादुपमानात् प्रागनुमानं निरूप्यते ।

2 तत्र व्याप्तिविशिष्ट-पक्षधर्म्मताज्ञानजन्यं ज्ञानमनु-
मितिस्तत्करणमनुमानं तच्च लिङ्गपरामर्शो न तु परा-
मृश्यमाणं लिङ्गमिति वक्ष्यते ।

21 अथानुमानं न प्रमाणं योग्योपाधीनां योग्यानु-
पलब्ध्याभावनिश्चयेऽप्ययोग्योपाधिशङ्कया व्यभिचार-
संशयात् शतशः सहचरितयोरपि व्यभिचारोपलब्धेश्च
लोके धूमादिदर्शनानन्तरं वह्न्यादिव्यवहारश्च सम्भा-
22 वनामात्रात् संवादेन च प्रामाण्याभिमानादिति नाप्र-
त्यक्षं प्रमाणमिति, न, अप्रमाणसाधर्म्म्येणाप्रामाण्य-
साधने दृष्टसाधर्म्म्यस्यानुमानत्वात् एतद्वाक्यस्य सन्दिग्ध-
23 विपर्य्यस्तान्यतरं प्रत्यर्थवत्त्वात् तयोश्च परकीययोर-
प्रत्यक्षत्वात् अनुमानमप्रमाणमिति वाक्यस्य प्रामा-

24 ण्याप्रामाण्यव्याघाताच्च। अपिचानुमानाप्रामाण्ये प्रत्यक्षस्याप्यप्रमाणत्वापत्तेः प्रामाण्यस्यानुमेयत्वात् स्वतश्च प्रामाण्यग्रहे तत्संशयानुपपत्तेः। व्याप्तिग्रहोपायश्च वक्ष्यते।

इति श्रीमद्गङ्गेशोपाध्यायविरचिते तत्त्वचिन्तामणौ अनुमानखण्डे अनुमितिनिरूपणं।

27 अथ व्याप्तिवादः ।

नन्वनुमितिहेतुव्याप्तिज्ञाने का व्याप्तिः न तावद्-
व्यभिचरितत्वं तद्धि न साध्याभाववदवृत्तित्वम् साध्य-
30 वद्भिन्नसाध्याभाववदवृत्तित्वं साध्यवत्प्रतियोगिकान्यो-
न्याभावासामानाधिकरण्यं सकलसाध्याभाववन्निष्ठा-
31 भावप्रतियोगित्वं साध्यवदन्यावृत्तित्वं वा केवलान्व-
यिन्यभावात् ।

48 इति श्रीमद्गङ्गेशोपाध्यायविरचिते तत्त्वचिन्तामणौ
अनुमानखण्डे व्याप्तिवादे व्याप्तिपञ्चकं ।

49 अथ सिंह-व्याघ्रोक्तव्याप्तिलक्षणरहस्यम् ।

नापि साध्यासामानाधिकरण्यानधिकरणत्वं साध्य-
वैयधिकरण्यानधिकरणत्वं वा, तदुभयमपि साध्यान-
50 धिकरणानधिकरणत्वं तच्च तच यत्किञ्चित्साध्यानधि-
करणाधिकरणे धूमे चासिद्धम् ।

52 इति श्रीमद्गङ्गेशोपाध्यायविरचिते तत्त्वचिन्तामणौ
अनुमानखण्डे सिंह-व्याघ्रोक्तव्याप्तिलक्षणम् ।

53 ## अथ व्यधिकरणधर्म्मावच्छिन्नाभावः ।

अथेदं वाच्यं ज्ञेयत्वादित्यत्र समवायितया वाच्यत्वा-
भावोघट एव प्रसिद्धः व्यधिकरणधर्म्मावच्छिन्नप्रतियो-
गिताकाभावस्य केवलान्वयित्वात् । नचैवं घट एव व्य-
भिचारः, साध्यतावच्छेदकावच्छिन्नप्रतियोगिताकाभा-
54 ववद्वृत्तित्वं हि व्यभिचारः, न च वाच्यत्वाभावस्तादृशो-
घटे, इति चेत्तर्हि तादृशसाध्याभावसामानाधिकर-
ण्याभावोव्याप्तिः । तथाचाप्रसिद्धिः प्रतियोग्यवृत्तिश्च
धर्म्मो न प्रतियोगितावच्छेदकः तद्विशिष्टज्ञानस्याभाव-
55 धीहेतुत्वात् अन्यथा निर्व्विकल्पादपि घटोनास्तीति
प्रतीत्यापत्तेः, गवि शशशृङ्गं नास्तीतिप्रतीतेरप्रसिद्धेः
शशशृङ्गं नास्तीति च शशे शृङ्गाभावइत्यर्थः ।

इति श्रीमद्गङ्गेशोपाध्यायविरचिते तत्त्वचिन्तामणौ अनुमानखण्डे व्याप्तिवादे व्यधिकरणधर्म्मावच्छिन्नाभावः ॥

69 ## अथ पूर्व्वपक्षः ।

अथ साध्यासामानाधिकरण्यानधिकरणत्वे सति
साधिकरणत्वं व्याप्तिः केवलान्वयिनि साध्यासामाना-
धिकरण्यं निरधिकरणे आकाशादौ प्रसिद्धमिति चेत् ।
70 न । साध्यासामानाधिकरण्यं हि न साध्यानधिकरणा-
धिकरणत्वं साध्याधिकरणानधिकरणत्वं वा केवलान्व-
यिनि यत्किञ्चित्साध्याधिकरणानधिकरणे धूमे चा-
71 व्याप्तेः । नापि स्वसमानाधिकरणात्यन्ताभावाप्रति-
योगिसाध्यसामानाधिकरण्यं पर्व्वतीयवह्नेर्म्महानसीय-
धूमसमानाधिकरणात्यन्ताभावप्रतियोगित्वात् द्रव्यत्वा-
देरव्याप्यवृत्त्यव्याप्यतापत्तेश्च । न च प्रतियोगिविरो-
72 धित्वं व्याप्यवृत्तित्वं वा अभावविशेषणं देयं, संयोगादौ
साध्ये सत्त्वादेरनैकान्तिकत्वाभावप्रसङ्गात् । न हि
प्रतियोगिविरोधी संयोगादेरपरोऽत्यन्ताभावोऽस्ति,
अधिकरणभेदेनाभावभेदाभावात् । नापि साधनव-
न्निष्ठान्योन्याभावाप्रतियोगिसाध्यवत्कत्वं व्याप्तिः मूले
73 वृक्षः कपिसंयोगवान्नेत्यबाधितप्रतीतेः तदन्योन्याभाव-
स्यापि तत्र सत्त्वात् । न चैवं भेदाभेदः, अवच्छेदकभेदेन

74 तत्सत्त्वाभ्युपगमात् साधनवन्निष्ठान्योन्याभावाप्रति-
योगि साध्यवद्यस्येति षष्ठ्यर्थव्याप्य-व्यापकभावानिरू-
पणात् साध्य-साधनयोर्व्याप्तिनिरूप्यत्वात् वह्निमत्पर्व्व-
तस्य धूमवन्महानसनिष्ठान्योन्याभावप्रतियोगित्वाच्च
75 विशेषाभावकूटादेवाभावव्यवहारोपपत्तौ सामान्या-
भावे मानाभावात्। नापि साधनसमानाधिकरण-
यावद्धर्म्मनिरूपितवैयधिकरण्यानधिकरणसाध्यसामा-
76 नाधिकरण्यं साधनसमानाधिकरणस्य प्रमेयत्वादे-
र्व्वैयधिकरण्याप्रसिद्धेः महानसादौ समवायितया
वह्नि-वह्निमतोरत्यन्तान्योन्याभावयोः सत्त्वात् धूमा-
77 दावप्युक्तलक्षणाभावाच्च। अथानौपाधिकः सम्बन्धो-
व्याप्तिः उपाधिश्च साध्यव्यापकत्वे सति साधनाव्यापकः,
व्यापकत्वन्तु तद्वन्निष्ठात्यन्ताभावाप्रतियोगित्वं, व्यभि-
चारे चावश्यमुपाधिः, प्रतियोगित्वं न विरोधित्वं सहा-
78 नवस्थाननियमलक्षणं गोत्वाश्वत्वयोरतथात्वात् अन्यो-
न्याभावप्रतियोगिन्यसत्त्वाच्च। किन्तु यथाधिकरणा-
भावयोः स्वरूपविशेषः सम्बन्धः तथा प्रतियोगित्वमनु-
79 योगित्वमपि, अभावविरहात्मत्वं वेति चेत्, यत्किञ्चि-
त्साध्यव्यापक-साधनाव्यापकधर्म्मनिषेधो न धूमादौ,
प्रकृतसाध्यव्यापक-साधनाव्यापकधर्म्मश्च सिद्ध्यसिद्धिभ्यां

न निषेद्धुं शक्यः यावत्साध्यव्यापके प्रमेयत्वादौ साध-
80 नाव्यापकत्वं यावत्साधनाव्यापके च घटत्वादौ साध्य-
व्यापकत्वं निषिध्यत इति चेत्। न। व्यधिकरणत्वात् या-
वत्साधनाव्यापकमव्यापकं यत्साध्यस्य, यावत्साध्यव्या-
पकं व्यापकं वा यस्य तत्त्वं तदिति चेत्। न। सोपाधेरपि
81 तथात्वात्, तथाहि साधनस्य वह्नेरव्यापकं यावदार्द्रे-
न्धनन्तत् प्रत्येकमव्यापकं साध्यधूमस्य, द्वितीये साध्य-
धूमस्य व्यापकमार्द्रेन्धनं तत् व्यापकं महानसीयवह्नेः।

82 नापि साध्यं यावद्व्यभिचारि तदव्यभिचारित्व-
मनौपाधिकत्वं, साध्याव्यभिचारित्वस्यैव गमकत्वसम्भ-
वात्, तच्च दूषितम्।

83 नापि कार्त्स्न्येन सम्बन्धो व्याप्तिः एकव्यक्तिके
तदभावात् नानाव्यक्तिकेऽपि सकलधूमसम्बन्धस्य प्र-
त्येकवह्नावभावात्। अत एव न कार्त्स्न्येन साध्येन
सम्बन्धो व्याप्तिः विषमव्याप्ते तदभावाच्च। न च या-
वत्साधनाश्रयाश्रितसाध्यसम्बन्धः, साधनाश्रये महा-
नसादौ सकले प्रत्येकवह्नेराश्रितत्वाभावात्।

84 नापि साधनसमानाधिकरणयावद्धर्मसमानाधि-
करणसाध्यसामानाधिकरण्यं, यावद्धर्मसामानाधिक-
रण्यं हि यावत्तद्धर्माधिकरणाधिकरणत्वं तच्चाप्रसिद्धं

साधनसमानाधिकरणसकलमहानसत्वाद्यधिकरणा-
प्रतीतेः ।

85 नापि स्वाभाविकः सम्बन्धो व्याप्तिः, स्वभावजन्यत्वे
तदाश्रितत्वादौ वा अव्याप्त्यतिव्याप्तेः ।

नाप्यविनाभावः, केवलान्वयिन्यभावात् ।

86 अथ सम्बन्धमात्रं व्याप्तिः व्यभिचारिसम्बन्धस्यापि
केनचित् सह व्याप्तित्वात्, धूमादिव्याप्तिस्तु विशिष्यैव
निर्व्वक्तव्येति, तन्न, लिङ्गपरामर्शविषयव्याप्तिस्वरूप-
87 निरूपणप्रस्तावे लक्षणाभिधानस्यार्थान्तरत्वात् । न
च सम्बन्धमात्रं तथा, तद्बोधादनुमित्यनुत्पत्तेः ।

88 नापि व्याप्तिपदप्रवृत्तिनिमित्तमिदं सम्बन्धज्ञानेऽपि
व्याप्तिपदाप्रयोगात् ।

89 केवलान्वयिनि केवलान्वयधर्म्मसम्बन्धो व्यतिरे-
किणि साध्यवदन्यावृत्तित्वं व्याप्तिः एतयोरनुमिति-
विशेषजनकत्वं अनुमितिमात्रे पक्षधर्म्मतैव प्रयोजिका ।
90 न चातिप्रसङ्गः, विशेषसामग्रीसहिताया एव सामान्य-
सामग्र्याः कार्य्यजनकत्वनियमादिति केचित्, तदपि न,
साध्यवदन्यावृत्तित्वस्य धूमेऽसत्त्वात् वह्निमत्पर्व्वतान्य-
91 स्मिन् धूमसत्त्वात् । न च सकलसाध्यवदन्यावृत्तित्वं,
वह्निमतां प्रत्येकं तथात्वात् । सर्व्वत्र लक्षणे साध्यत्व-

साधनत्व-तदभिमतत्वानां व्याप्तिनिरूप्यत्वेनात्माश्रयः,
92 साध्यत्वं हि न सिद्धिकर्म्मत्वं, सिषाधयिषाविषयत्वं वा
महानसीयवह्नौ तदभावात्। न च सामान्यतो-
व्याप्त्यवगमोऽस्त्येव परस्य कथमन्यथा दूषणेनासाध-
93 कतां साधयेदिति वाच्यं। स्वार्थानुमानोपयोगिव्याप्ति-
स्वरूपनिरूपणं विना कथायामप्रवेशादिति।

इति श्रीमद्गङ्गेशोपाध्यायविरचिते तत्त्वचिन्तामणौ अनुमानाख्यद्वितीयखण्डे पूर्व्वपक्षः।

100 अथ सिद्धान्तलक्षणम्।

अत्रोच्यते। प्रतियोग्यसमानाधिकरणयत्समानाधिकरणात्यन्ताभावप्रतियोगितावच्छेदकावच्छिन्नं यन्न भवति तेन समं तस्य सामानाधिकरण्यं व्याप्तिः।

इति श्रीमद्गङ्गेशोपाध्यायविरचिते तत्त्वचिन्तामणौ अनुमानाख्यद्वितीयखण्डे सिद्धान्तलक्षणम्।

124 अथ सामान्याभावः ।

अन्यनिष्ठवह्नेर्धूमवत्पर्व्वतवृत्त्यत्यन्ताभावप्रतियोगित्वेऽपि तत्प्रतियोगिता न वह्नित्वेनावच्छिद्यते, धूमवति वह्निर्नास्तीत्यप्रतीतेः सामान्यावच्छिन्नप्रतियोगिताकाभावः पृथगेव, अन्यथा सकलप्रसिद्धरूपाभावे प्रसिद्धरूपवदन्यत्वे चावगते वायौ रूपं न वा वायूरूपवान्न वेति संशयो न स्यात् विशेषाभावकूटस्य निश्चितत्वात् ।

इति श्रीमद्गङ्गेशोपाध्यायविरचिते तत्त्वचिन्तामणौ अनुमानाख्यद्वितीयखण्डे सामान्याभावः ॥

130 विशेषव्याप्तिः ।

यद्वा प्रतियोगिव्यधिकरणस्वसमानाधिकरणात्यन्ता-
भावाप्रतियोगिना सामानाधिकरण्यं, यत्समानाधि-
131 करणान्योन्याभावप्रतियोगि यद्वन्न भवति तेन समं
तस्य सामानाधिकरण्यं वा, स्वसमानाधिकरणान्योन्या-
132 भावाप्रतियोगियद्वत्कत्वं वा । अन्यवृत्तिवह्नि-तद्वतोर-
न्यवृत्तिधूमवन्निष्ठात्यन्ताभावान्योन्याभावप्रतियोगि-

133 त्वाद्व्यधिकरणवह्नि-धूमयोर्न व्याप्तिः, किन्तु तत्तद्धूमस्य
समानाधिकरणतत्तद्वह्निना। नचैवं धूममात्रे न व्याप्ति-
134 रिति वाच्यं। सर्व्वधूमव्यक्तेस्तथात्वेन धूममात्रस्य व्या-
135 प्यत्वात्। धूमसम्बन्धिवह्निस्तु व्याप्य एव, युगपदुत्पन्न-
136 विनष्टयोश्च व्याप्तिरेव। कर्म्मणि च संयोगाभावः
प्रतियोग्यसमानाधिकरणः।

142 यद्वा प्रतियोगिवैयधिकरण्यावच्छेदकावच्छिन्नत्व-
मत्यन्ताभावविशेषणं कर्म्मणि च संयोगाभावस्य प्रति-
योगिवैयधिकरण्यावच्छेदकावच्छिन्नत्वमेव। न चा-
न्योन्याभावस्याव्याप्यवृत्तित्वम्, अभेदस्याबाधितप्रत्य-
145 भिज्ञानात्। व्याप्य-व्यापकभावाज्ञानेऽपि वस्तुसतस्त-
थात्वेनाज्ञायमानस्य सम्बन्धत्वेनैव भातस्य षष्ठ्यर्थत्वं।
146 नचैवमननुगमो दोषाय, कस्य का व्याप्तिरित्यननु-
गतस्यैव लक्ष्यत्वात्। अथ धूमवति वह्नि-ह्रदौ न
147 स्तः धूमवान् वह्निमद्ध्रदौ न भवतीतिप्रतीतेर्व्यासज्य-
वृत्तिप्रतियोगिकौ वह्नि-वह्निमतोरत्यन्तान्योन्याभावौ
148 धूमवति विद्येते इति कथमेते लक्षणे इति चेत्। न।
तादृशाभावानभ्युपगमात् अभ्युपगमे वा तत्र तदुभयं
प्रतियोगि न वह्नि-वह्निमन्तौ।

149 अथवानौपाधिकत्वं व्याप्तिः तच्च यावत्स्वसमाना-

धिकरणात्यन्ताभावप्रतियोगितावच्छेदकावच्छिन्नं यत्
150 तत्प्रतियोगिकात्यन्ताभावसमानाधिकरणं यत् तेन
समं सामानाधिकरण्यम् । नह्येवं सोपाधिः, तत्र
151 साधनसमानाधिकरणात्यन्ताभावप्रतियोगिन आर्द्रे-
न्धनवत्त्वादेरुपाधेर्योऽत्यन्ताभावस्तेन समं साध्यस्य
152 धूमादेः सामानाधिकरण्याभावात् उपाधेः साध्य-
व्यापकत्वात् । एतदेव यावत्स्वव्यभिचारिव्यभिचारि-
साध्यसामानाधिकरण्यमनौपाधिकत्वं गीयते ।
153 यद्वा यावत्समानाधिकरणात्यन्ताभावाप्रतियोगि-
154 प्रतियोगिकात्यन्ताभावसमानाधिकरण्यं यस्य तस्य
तदेवानौपाधिकत्वं सोपाधौ तु साध्यवन्निष्ठात्यन्ताभा-
155 वाप्रतियोगिन उपाधेर्योऽत्यन्ताभावस्तेन समं हेतोः
सामानाधिकरण्यम् उपाधेः साधनाव्यापकत्वात् ।
156 यद्वा यत्सम्बन्धितावच्छेदकरूपवत्त्वं यस्य तस्य सा
व्याप्तिः । तथाहि धूमस्य वह्निसम्बन्धित्वे धूमत्वम-
157 वच्छेदकं धूममात्रस्य वह्निसम्बन्धित्वात्, वह्नेस्तु धूम-
सम्बन्धे न वह्नित्वमवच्छेदकं धूमासम्बन्धिनि गतत्वात्,
158 न ह्यतिप्रसक्तमवच्छेदकं, संयोगादौ तथात्वादर्शनात् ।
किन्तु वह्नावार्द्रेन्धनप्रभववह्नित्वं धूमसम्बन्धितावच्छे-
दकं, तादृशश्च व्याप्यमेव ।

159 अथवा यत्सामानाधिकरण्यावच्छेदकावच्छिन्नं यस्य
160 स्वरूपं तत्तस्य व्याप्यं वह्निसामानाधिकरण्यं हि धूमे
धूमत्वेनावच्छिद्यते सोपाधौ तूपाधिना ।

165 अतएव चतुष्टयं ।

अतएव साधनतावच्छेदकभिन्नेन येन साधनताभिमते साध्यसम्बन्धोऽवच्छिद्यते स एव तत्र साधने विशेषणमुपाधिरिति वदन्ति । अतएव च तत्र साधनाव्यापकत्वे सति साधनावच्छिन्नसाध्यव्यापकत्वं लक्षणं ध्रुवं, व्यभिचारिणि साधने एकत्र साध्य-तद्भावयोर्विरोधेनावच्छेदकभेदं विना तदुभयसम्बन्धाभावादवश्यं
166 साध्यसम्बन्धितावच्छेदकत्वात्, तदेव च साधनावच्छिन्नसाध्यव्यापकं साधनाव्यापकं तत्रोपाधिः, अतएव व्यभिचारे चावश्यमुपाधिरिति सङ्गच्छते । अन्यथा व्यभिचारादेव तत्रागमकत्वेन व्यभिचारित्वेन न तदनुमानमप्रयोजकत्वात् । अतएव च तस्य साध्यसम्बन्धि-
167 तावच्छेदकरूपलक्षणा व्याप्तिः साधनताभिमते च-कास्तीति स्फटिके जवाकुसुमवदुपाधिरसावुच्यते । लक्षणन्तु साध्य-साधनसम्बन्धव्यापकत्वे सति साधनाव्यापकत्वं, विषमव्याप्तस्तु नोपाधिपदवाच्यः प्रवृत्ति-

168 निमित्ताभावात्। दूषकता च तस्य व्यभिचारोन्नायकतया। न च व्यभिचारोन्नायकत्वमेवोपाधित्वं अप्रयोजकसाध्यव्यापकव्यभिचरिणोरप्युपाधित्वापत्तेरिति।

इति श्रीमद्गङ्गेशोपाध्यायविरचिते तत्त्वचिन्तामणौ अनुमानाख्यद्वितीयखण्डे विशेषव्याप्तिः। समाप्तश्च व्याप्तिवादः।

TRANSLITERATION, TRANSLATION AND COMMENTARY

ANUMITINIRŪPAṆA AND *VYĀPTIVĀDA*

Abbreviations in the commentary

G. for Gaṅgeśa

M. for Mathurānātha

SECTION I

General observations about inference

§ 1. *The place of inference in an account of the means of knowledge. Definitions*

1.4 *Pratyakṣôpajīvakatvāt pratyakṣânantaraṃ bahu-vādi-saṃmatatvād upamānāt prāg anumānaṃ nirūpyate.*

2.1 *Tatra vyāpti-viśiṣṭa-pakṣa-dharmatā-jñāna-janyaṃ jñānam anumitis tat-karaṇam anumānaṃ tac ca liṅga-parāmarśo na tu parāmṛṣyamānaṃ liṅgam iti vakṣyate.*

1.4–5. Having considered perception we now turn to inference; for inference depends on perception. Inference is most generally recognized in the schools, and therefore is considered before identification.

2.1–3. A conclusion, then, is a knowledge which arises from the knowledge that [a thing's] being an attribute of a subject is qualified by a pervasion; inference [i.e. inferential means] is its proximate cause; this is the consideration of a sign, not the sign considered, as will be explained later.

1.4. *Pratyakṣôpajīvakatvāt.* Both inference and identification depend on perception. The former needs the perception of a concomitance (e.g. the concomitance of fire and smoke in the kitchen), the latter the perception of a similarity (e.g. the similarity of a rhinoceros to an elephant). For the four means of valid knowledge (*pramāṇa*) see p. 17 and Ingalls, p. 29.

1.4–5. *pratyakṣânantaraṃ ... nirūpyate.* The present book on inference follows upon the book on perception and precedes the book on identification.

1.4–5. *bahu-vādi-saṃmatatvād.* All orthodox schools treat inference as a separate means of knowledge that is valid. But identification is not so treated. The Sāṃkhya and the Vaiśeṣika reject it as a distinct means of

knowledge. While the latter school regard it simply as a kind of inference, the former analyse it into the three processes they admit as valid means of knowledge: perception, inference and verbal knowledge.

2.1. *vyāpti-viśiṣṭa-pakṣa-dharmatā.* I have adopted the most natural interpretation of this compound by making *viśiṣṭa* adjectivally refer to *pakṣa-dharmatā. viśiṣṭa* 'qualified' is often used in the sense of 'accompanied by' (Ingalls, p. 69, n. 137). Thus we can say that *pakṣa-dharmatā* (corresponding to the minor premiss of a syllogism) combined with *vyāpti* (corresponding to the major premiss) adequately characterizes the antecedent of an argumentation, *anumiti* as conclusion being the consequent of it. Cf. p. 11.

2.1. *vyāpti.* For the precise meaning of 'pervasion' see p. 6.

2.1. *pakṣa-dharmatā*, 'being a subject's attribute', i.e. the fact that in a valid (positive) inference the reason (*hetu*) is an attribute belonging to, and occurring in, the subject (*pakṣa*), whose possession of another attribute (*sādhya*, 'probandum') is to be inferred.

2.1–2. *anumiti*, 'that which is inferred', just as conclusio means 'id quod concluditur'. Cf. Ingalls p. 29, n. 5.

2.2. *anumāna* is used here in the strict sense of 'inferential means', but may be translated by 'inference', since it usually indicates the whole inferential process as expressed in the form of an argument like The mountain has fire because it has smoke. The conclusion (*anumiti*) in this example is The mountain has fire. Cf. p. 11.

2.2. *karaṇa* is naturally used of the efficient or instrumental cause. In a more technical sense, which occurs in the modern school, it designates the proximate cause, i.e. that which immediately and necessarily precedes the effect. In this sense it is thought of as the function or activity (*vyāpāra*) through which the cause produces its result.

2.2. *liṅga-parāmarśa.* As the proximate cause of a conclusion the inferential process is said to be the consideration of a sign. A sign (*liṅga*) is a symptom from which we infer; it functions as the reason (*hetu*) in an inference. Thus in 'The mountain has fire because it has smoke' smoke is a sign (of fire), and the consideration of the sign is expressed in the form 'The mountain has smoke, which is pervaded by fire' (*vahni-vyāpya-dhūmavān parvataḥ*).

2.3. *vakṣyate*, viz. in 530,4; but there the wider term *kāraṇa* (cause) is used.

§ 2. *Inference is a valid means of knowledge*

21.1 *Athânumānaṃ na pramāṇaṃ yogyôpādhīnāṃ yogyânupalabdhyâbhāva-*
-niścaye 'py ayogyôpādhi-śaṅkayā vyabhicāra-saṃśayāt, śataśaḥ sahacari-
tayor api vyabhicārôpalabdheś ca, loke dhūmâdi-darśanânantaraṃ vahny-
*22.1 *-ādi-vyavahāraś ca saṃbhā*vanā-mātrāt saṃvādena ca prāmāṇyâbhimānād*
iti nâpratyakṣaṃ pramāṇam iti,
na, apramāṇa-sādharmyenâprāmāṇya-sādhane dṛṣṭa-sādharmyasyânu-
*23.1 *mānatvāt, etad-vākyasya saṃdigdha-*viparyastânyataraṃ praty artha-*
vattvāt tayoś ca parakīyayor apratyakṣatvāt, anumānam apramāṇam iti
*24.1 *vākyasya prāmā*ṇyâprāmāṇyayor vyāghātāc ca. Api cânumānâprāmāṇye*
pratyakṣasyâpy apramāṇatvâpatteḥ prāmāṇyasyânumeyatvāt svataś ca
prāmāṇya-grahe tat-saṃśayânupapatteḥ.
Vyāpti-grahôpāyaś ca vakṣyate.

21.1.–22.2. [Objection.] 'But inference is not a valid means of knowledge. For even when we are sure of the absence of visible accidents because we have not perceived a visible thing [supervening], there still remains our doubt as to deviation since an invisible accident might be involved. Further, we perceive deviation even among pairs of things that go a hundred times together. That in daily life a man speaks of fire immediately after the seeing of smoke is due to the fact that he merely supposes it [to be present] and because of the correspondence [with the facts of experience] thinks this to be valid knowledge. Consequently it is not true that something that is not perception is a valid means of knowledge.'

22.2.–24.3. [Answer.] We do not agree for the following reasons: (1) If you want to prove the invalidity [of inference] by using [an example expressing] homogeneity with what is not a valid means of knowledge, the actual use of such a homogeneity amounts to an inference. (2) The sentence 'Inference is not a valid means of knowledge' is meaningful only if it says either (a) that the assertion ['Inference is a valid means of knowledge'] is doubtful or (b) that the opposite ['Inference is an invalid means of knowledge'] is true. Both these manners [of rejecting an assertion] relate to another source [of knowledge] since they are not known by means of perception. (3) The statement 'Inference is an invalid means of knowledge', whether true or untrue, involves a contradiction [of the assumption that what is not perception is not a valid means of knowledge]. (4)

Further, if inference were an invalid means of knowledge, perception would be so too, since it is by an inference that the validity [of perception] is established. If the validity [of perception] were grasped of itself, it would be impossible for us to have any doubt about it.

24.3–4. We shall also discuss induction.

21.1–22.2. *Athânumānaṃ. . .pramāṇam iti.* The objection is made by the Cārvāka school who, heterodox and materialistic (*lokāyata*), reduce the means of knowledge to perception alone. They deny the validity of inference because they think invariable concomitance impossible.

21.1–2. *yogyôpādhīnāṃ. . .ayogyôpādhi-śaṅkayā.* For *upādhi* (accident) see p. 14. *yogya* and *ayogya* must be understood by reference to sense-perception. Their meaning here is 'visible' and 'invisible' respectively. This is made plain by the examples given by M. (20.7–15); a visible accident (*yogyôpādhi*) is fuel (*indhana*), an invisible accident (*ayogyôpādhi*) is mind (*manas*) or air (*vāyu*), the latter being invisible according to the view that the possibility of perception implies manifest colour (*udbhūta-rūpavat*, cf. Dīdh. 561: *'udbhūta-rūpavati yogye vahnau'*). It may be added that in the first chapter on Induction (200.3) there is a reference to people calling some characteristics of pervasion *yogya* because these characteristics can be grasped by sense-perception. As for other systems, we find *yogya* and *ayogya* having the same special meaning in Sāṃkhyasūtra V. 44.

21.2. *vyabhicāra*, 'deviation', see p. 7.

22.1.–2. *nâpratyakṣaṃ pramāṇam.* The Cārvāka school reject for similar reasons identification and verbal knowledge as separate means of knowledge. These means of knowledge have been condemned also by some of the orthodox schools on the ground that they do not essentially differ from inference. Cf. § 1, second note on 1.4–5.

22.3. *sādharmya*, 'homogeneity'. If we want to prove a point in debate, we must use the five-membered syllogism (*nyāya*, p. 11). This implies the use of an 'example' (*udāharaṇa*) showing that the loci of the reason, because of their possession of the probandum, are 'homogeneous with' the loci of the probandum. Thus if we want to prove The mountain has fire, one of our assertions must be Where there is smoke there is fire, as in a kitchen. This assertion (*udāharaṇa*) is followed by the 'application' (*upanaya*), asserting that the mountain has smoke, and the conclusion (*nigamana*) that the mountain has fire. Thus the use of an 'example' which

deals with 'homogeneity', i.e. which is positive, involves the use of an inference.

22.3–23.1. *saṃdigdha-viparyasta-*. I have adopted the interpretation of M. (24.8–12). The assertion to be rejected, then, is: Inference is a valid means of knowledge. One can reject this either (a) by way of doubt (*saṃśaya*) or (b) by way of opposition (*viparyaya*). His denial is of the form 'Inference is not a valid means of knowledge' (*anumānaṃ na pramāṇam*, 21.1). In case (a) his denial means: Inference is or is not a valid means of knowledge (*anumānaṃ pramāṇaṃ na vā*); the assertion is considered to be doubtful (*saṃdigdha*). In case (b) the meaning of the denial is: Inference is quite an invalid means of knowledge (*anumānam apramāṇam eva*); the opposite (*viparyasta*) of the assertion is stated to be true.

But arguments (1) and (2) may equally well be taken in reference to the invalidity, not only of inference, but of all means of knowledge other than perception, as is stated in the final sentence of the objection (22.1–2). This corresponds better with the object of argument (3).

23.2–24.1. *anumānam...vyāghātāc ca.* Again I adopt M.'s interpretation (24.12–18): If the statement 'Inference is an invalid means of knowledge' is true, then verbal testimony (*śabda*), which is the means of knowledge under which the statement falls, must be a valid means of knowledge. If the statement is untrue, it follows that the invalidity of inference is an error (*bhrama*); otherwise the statement could not be untrue. This implies that inference is a valid means of knowledge. Thus in either case you are contradicting your assumption that anything that is not perception cannot be a valid means of knowledge.

24.2–3. *svataś ca prāmāṇya-grahe.* This refers to the Mīmāṃsā doctrine of the self-evidence of knowledge (Dasgupta, pp. 372–5).

24.3–4. *Vyāpti-grahôpayaś ca vakṣyate.* The theory of induction is given after the theory of pervasion and starts at 174.2. *vyāpti-grahôpāya* is 'means of grasping pervasion', i.e. induction.

SECTION II

Theory of pervasion

CHAPTER I

FIVE DEFINITIONS OF PERVASION AS NON-DEVIATION

27.2 *Nanv anumiti-hetu-vyāpti-jñāne kā vyāptiḥ? Na tāvad avyabhicaritatvaṃ,*
*30.1 *tad dhi na sādhyâbhāvavad-avṛttitvaṃ sādhya*vad-bhinna-sādhyâbhāvavad-*
-avṛttitvaṃ sādhyavat-pratiyogikânyonyâbhāvâsāmānādhikaraṇyaṃ sakala-
*31.1 *-sādhyâbhāvavan-niṣṭhâ*bhāva-pratiyogitvaṃ sādhyavad-anyâvṛttitvaṃ vā,*
kevalânvayiny abhāvāt.

27.2–31.2. What is pervasion in that knowledge of a pervasion which is the cause of a conclusion? It is not [the reason's] non-deviation [from the probandum]. For that cannot be (1) [the reason's] non-occurrence in the loci of absence of the probandum, (2) [the reason's] non-occurrence in the loci of absence of the probandum which are different from locus of the probandum, (3) [the reason's] having no common locus with a mutual absence whose counterpositive is locus-of-the-probandum, (4) [the reason's] being the counterpositive of an absence resident in all loci of absence of the probandum or (5) [the reason's] non-occurrence in what is other than locus of the probandum, since it would then fail to apply in the case of universal-positives.

27.2. *Nanv... vyāptiḥ?* I.e., what do we mean by pervasion when we say that knowledge of a pervasion is the cause of a conclusion? Knowledge of a pervasion is, as we have seen in Section I § 1 (2.1), an essential element in the knowledge that gives rise to a conclusion.

27.3–31.1. *sādhyâbhāvavad-... vā.* G. offers five definitions of non-deviation (*avyabhicaritatva*). (For the meaning of 'deviation' see p. 7). Inasmuch as pervasion is identified with non-deviation, these definitions are used as definitions of pervasion. Of the definitions of pervasion found in the Tattvacintāmaṇi, these five are the only ones which have been fully explained by modern scholars. An exhaustive account of 'the five defi-

nitions of pervasion' (*vyāpti-pañcaka*) with the commentaries of M. and Raghunātha is given in Ingalls, sections III, IV and V.

27.3. *-avṛttitva*, i.e. the fact that the reason does not occur in –. I prefer the translation of *avṛttitva* by 'non-occurrence' to the more literal translation by 'non-occurrentness' (Ingalls, p. 86).

27.3–30.1. *sādhyavad-bhinna-...avṛttitvam*. Unlike Ingalls I have brought the translation of definition (2) into line with the interpretation of the Old School (*prāñcaḥ*, M. 39.18–20, Ingalls, pp. 126–127), because their analysis is the natural one. The definition, then, is a refinement of definition (1), apparently made to point out that we must exclude from the loci of absence of the probandum that which is at the same time locus of the attribute and locus of absence of the attribute. This attribute can only be contact, which is taken to be of incomplete occurrence (*avyāpya-vṛtti*, see p. 9).

30.1–2. *sādhyavat-...-asāmānādhikaraṇyaṃ*. Definition (3), if correctly interpreted, is nothing but a verbal variant of definition (5) (cf. M. 42.7–8, 43.6–9).

30.2. *sakala*, 'all'. The use of a universal quantifier (p. 12) is correct. While the other definitions *deny* that the reason occurs in *a* locus of absence of the probandum, definition (4) *asserts* that the reason is absent from *all* loci of absence of the probandum.

31.1–2. *kevalânvayiny abhāvāt*, 'since it would then fail to apply in the case of universal-positives', i.e. in the case of inferences with a universal-positive probandum. If the probandum is universal-positive (*kevalânvayin*, p. 5), absence (=constant absence) of the probandum as well as mutual absence of locus of the probandum will be unexampled (*aprasiddha*), because there is no locus of them (cf. p. 18). The five definitions of non-deviation, therefore, cannot be used in the case of true inferences with a universal-positive probandum. Hence these definitions are too narrow (*avyāpti*, p. 10). The inferences referred to being of the type 'It is name-able because it is knowable' (*idaṃ vācyaṃ jñeyatvāt*, cf. 53.2), in which the reason is equally universal-positive, the phrase '*kevalânvayiny abhāvāt*' can also be taken to mean 'since it would then fail to apply to a universal-positive reason (as its subject)' (cf. 77.1 and p. 87).

The meaning of the five definitions can be best understood if we apply them to two examples of inference, of which the second is a case of universal-positives.

Example I: It has fire because it has smoke (*vahnimān dhūmāt*).
Reason: smoke.
Loci of the reason: mountain, kitchen, ...
Loci of absence of the reason: lake, red-hot iron, ...
Probandum: fire.
Loci of the probandum: mountain, kitchen, red-hot iron, ...
Loci of absence of the probandum: lake, ...

Definition (1): the reason's non-occurrence in the loci of absence of the probandum.

Application to the example: Smoke does not occur in lake or any other locus of absence of fire. – True.

Definition (2): the reason's non-occurrence in the loci of absence of the probandum which are different from locus of the probandum.

Application to the example: Smoke does not occur in lake or any other locus of absence of fire which is different from locus of fire, i.e. which is not locus of fire. – True. (Any locus of absence of fire is not locus of fire.)

Definition (3): the reason's having no common locus with a mutual absence whose counterpositive is locus-of-the-probandum.

Application to the example: Smoke does not have for its locus lake or any other thing which is neither mountain nor kitchen nor red-hot iron nor another locus of fire. – True. (For the meaning of 'mutual absence' and 'counterpositive' see p. 8.)

Definition (4): the reason's being the counterpositive of an absence resident in all loci of absence of the probandum.

Application to the example: Smoke is absent from lake and all other loci of absence of fire. – True.

Definition (5): the reason's non-occurrence in what is other than locus of the probandum.

Application to the example: Smoke does not occur in lake or any other thing other than mountain, kitchen, red-hot iron and the other loci of fire. – True.

Example II: It is nameable because it is knowable (*idaṃ vācyaṃ jñeyatvāt*).
Reason: knowableness.
Loci of the reason: all things.
Loci of absence of the reason: none.
Probandum: nameableness (*vācyatva*).

Loci of the probandum: all things.
Loci of absence of the probandum: none.

Definition (1): the reason's non-occurrence in the loci of absence of the probandum.

Application to the example: The application is impossible because there is no locus of absence of nameableness.

Definition (2): the reason's non-occurrence in the loci of absence of the probandum which are different from locus of the probandum.

Application to the example: Impossible. See under definition (1).

Definition (3): the reason's having no common locus with a mutual absence whose counterpositive is locus-of-the-probandum.

Application to the example: The application is impossible because that which is not a locus of nameableness cannot be found, everything being nameable.

Definition (4): the reason's being the counterpositive of an absence resident in all loci of absence of the probandum.

Application to the example: Impossible. See under definition (1).

Definition (5): the reason's non-occurrence in what is other than locus of the probandum.

Application to the example: Impossible. See under definition (3).

If we represent the logical content of the five definitions by the symbols of mathematical logic (see p. 30), then the definitions correspond to the following formulae:
definitions (1) and (2) to

(a) $(y)\,\{Ay \rightarrow \sim(Ex)\,[(z)\,(Bz \rightarrow \sim Szx) \wedge Ryx]\}$,

definitions (3) and (5) to

(b) $(y)\,\{Ay \rightarrow \sim(Ex)\,[(w)\,((Ez)\,(Bz \wedge Szw) \rightarrow (x \neq w)) \wedge Ryx]\}$,

definition (4) to

(c) $(y)\,\{Ay \rightarrow (x)\,[(z)\,(Bz \rightarrow \sim Szx) \rightarrow \sim Ryx]\}$.

(a), (b) and (c) are equivalent to

(d) $(x)\,[(Ey)\,(Ay \wedge Ryx) \rightarrow (Ey)\,(By \wedge Syx)]$,

which is a formula of pervasion (p. 32). From a purely logical point of

view the five definitions are correct because of the equivalence of (a), (b) and (c) to (d). In the case of universal-positives the condition

$$(Ex)(y)(By \rightarrow \sim Syx)$$

is not fulfilled.

CHAPTER II

TWO DEFINITIONS OF PERVASION CALLED LION-TIGER DEFINITION

49.2 *Nâpi sādhyâsāmānādhikaraṇyânadhikaraṇatvaṃ sādhya-vaiyadhikaraṇyân-*
*50.1 *adhikaraṇatvaṃ vā, tad ubhayam api sādhyân*adhikaraṇânadhikaraṇa-tvaṃ tac ca tatra yatkiṃcit-sādhyânadhikaraṇâdhikaraṇe dhūme câsid-dham.*

49.2–50.2. Nor [can pervasion be] (6) [the reason's] being no locus of [the property of] having a locus not in common with the probandum or (7) [the reason's] being no locus of [the property of] differing in locus from the probandum. Both [these definitions] mean '[the reason's] not having as locus a non-locus of the probandum'. This [formula] fails to apply (a) in the aforesaid case [of universal-positives], and (b) to smoke [when this is reason in the true inference It has fire because it has smoke], for, whichever probandum [(fire)] you take, smoke does have as locus a non-locus of it.

49.2–50.2. To determine the meaning of definition (6) we must take account of the ambiguity of *-asāmānādhikaraṇya.* This word has been used in definition (3) (chapter I, 30.2) in the proper sense of 'having no common locus with-'; M. (42.1–2) interprets it there as *vṛttitvâbhāva* 'absence of occurrence', the same as *avṛttitva* in definitions (1), (2) and (5). But in definition (6) it is used in the stricter sense 'having a locus not in common with-'. This is clear from the explanatory formula that follows. The meaning of *sādhyâsāmānādhikaraṇya* then is 'having a locus not in common with the probandum', i.e. 'having a locus which is not a locus of the probandum'. Now anything that is not a locus of an attribute can be said to be a non-locus of that attribute. Therefore *sādhyâsāmānādhi-*

karaṇya may be interpreted to mean 'having a locus which is a non-locus of the probandum', i.e. 'having as locus a non-locus of the probandum' (*sādhyânadhikaraṇâdhikaraṇatva*). The same sense may be ascribed to the expression, used by definition (7), *sādhya-vaiyadhikaraṇya* ('differing in locus from the probandum'), since this means, strictly, 'having a locus that is different from any locus of the probandum'. If, then, the definitions say that the reason is no locus of the property, i.e. does not possess the property, now expressed by 'having as locus a non-locus of the probandum', then their meaning must be that the reason does not have as locus a non-locus of the probandum (*sādhyânadhikaraṇânadhikaraṇatva*). If pervasion is thus correctly defined, what does it exactly mean? It means that any instance of the reason does not have as locus what is a non-locus of *every* instance of the probandum. This is clearly illustrated by the example 'It has fire because it has smoke'. Suppose there are two instances of the reason (smoke): mountain smoke, kitchen smoke, and three instances of the probandum (fire): mountain fire, kitchen fire, red-hot iron fire. Any instance of smoke does not have for its locus what is a non-locus of every instance of fire, for neither mountain smoke nor kitchen smoke has as its locus, for instance, lake, which is a non-locus both of mountain fire and of kitchen fire and of red-hot iron fire. Therefore smoke does not have as locus a non-locus of fire. Thus definitions (6) and (7) cover the pervasion in the true inference It has fire because it has smoke. But the definitions can be interpreted differently. The probandum, fire, is a class containing several members or individuals (*nānā-vyakti*, see p. 5), so that any of the instances of fire may be said to be probandum. Thus the probandum referred to may be an individual, not the class of the attribute. Then instead of saying 'fire' we say 'a fire'. Smoke has as locus a non-locus of a fire, for smoke has a locus (mountain) which is not the locus of kitchen fire. Similarly smoke has a locus (kitchen) which is not the locus of mountain fire, etc.. Thus smoke has as locus a non-locus of a fire, no matter what instance of fire it may be. The opposite of the definitions applies in the true inference It has fire because it has smoke. This impossible result due to not quantifying the probandum correctly in the definitory formula forms the second reason why G. rejects definitions (6) and (7), the first reason being the fact that the definitions are not suitable for the case of universal-positives.

49.3–50.1. *sādhyânadhikaraṇânadhikaraṇa*, 'not having as locus a non-

locus of the probandum', is a bahuvrīhi (possessive compound), to be taken as the contradictory of *sādhyânadhikaraṇâdhikaraṇa* (50.1–2), 'having as locus a non-locus of the probandum'.

50.1. *tatra*: 31.1–2. A non-locus of the probandum cannot be found in the case of universal-positives. Cf. my note on 31.1–2.

Symbolically we may represent 'having a locus not in common with the probandum' (*sādhyâsāmānādhikaraṇya*) and 'differing in locus from the probandum' (*sādhya-vaiyadhikaraṇya*) (i.e. 'having as locus a non-locus of the probandum') by

(1) $(Ey)\{Ay \wedge (Ex)[Ryx \wedge (z)(Bz \rightarrow \sim Szx)]\}.$

The formula of definitions (6) and (7), 'the reason's not having as locus a non-locus of the probandum' (*sādhyânadhikaraṇânadhikaraṇatva*), then is expressed by the contradictory of (1):

(2) $(y)\{Ay \rightarrow \sim(Ex)[Ryx \wedge (z)(Bz \rightarrow \sim Szx)]\}.$

(2) is equivalent to the formula of pervasion:

(3) $(x)[(Ey)(Ay \wedge Ryx) \rightarrow (Ey)(By \wedge Syx)].$

The statement of the form 'whichever fire (= B) you take, smoke (= A) has as locus a non-locus of it' corresponds to

(4) $(y)\{By \rightarrow (Ez)[Az \wedge (Ex)(Rzx \wedge \sim Syx)]\}.$

(5) $\perp (1) \rightarrow (4)$

CHAPTER III

ABSENCE LIMITED BY A PROPERTY WHOSE LOCI ARE DIFFERENT FROM ITS COUNTERPOSITIVE

53.2 *Athêdaṃ vācyaṃ jñeyatvād ity atra samavāyitayā vācyatvâbhāvo ghaṭa eva prasiddhaḥ, vyadhikaraṇa-dharmâvacchinna-pratiyogitākâbhāvasya keval-*

ânvayitvāt. Na câivaṃ ghaṭa eva vyabhicāraḥ, sādhyatâvacchedakâvac-
*54.1 *chinna-pratiyogitākâbhā*vavad-vṛttitvaṃ hi vyabhicāraḥ, na ca vācyatvâ-*
bhāvas tādṛśo ghate, iti cet

tarhi tadṛśa-sādhyâbhāva-sāmānādhikaraṇyâbhāvo vyāptiḥ, tathā câpra-
siddhiḥ. Pratiyogy-avṛttiś ca dharmo na pratiyogitâvacchedakaḥ, tad-
*55.1 *-viśiṣṭa-jñānasyâbhāva-*dhī-hetutvāt, anyathā nirvikalpād api ghaṭo nâstîti*
pratīty-āpatteḥ, gavi śaśa-śṛṅgaṃ nâstîti pratīter asiddheḥ. Śaśa-śṛṅgaṃ
nâstîti ca śaśe śṛṅgâbhāva ity arthaḥ.

53.2–54.2. [Objection.] 'But in the case of universal-positives such as "It is nameable because it is knowable" we do find an example: in pot there is an absence of [that which is] nameableness conjoined with [the property of] being a term of inherence, since an absence to which the counterpositiveness is limited by a property whose loci are different [from the counterpositive] is universal-positive. And there will be no deviation in pot [as locus], for deviation should be "[the reason's] occurrence in a locus of that absence to which the counterpositiveness is limited by the limitor of probandumness"; such an absence of nameableness does not exist in pot.'

54.2–55.3. [Answer.] Then pervasion should be the absence of [the property of] having a common locus with that kind of absence-of-the-probandum [which you prescribe for deviation]. Thus we do not have an example [in the case of universal-positives]. Further, a property which does not occur in the counterpositive cannot be a limitor of the counterpositiveness. For it is a knowledge qualified by this limitor that gives rise to the notion of an absence (otherwise a clear conception of 'There is no pot' would arise from an indeterminate knowledge as well). That is why a clear conception of 'On the cow there is no hare's horn' cannot be reached. 'There is no hare's horn' means 'In a hare there is an absence of horns'.

The subject of the chapter, as announced by the title, is *vyadhikaraṇa-dharmâvacchinnâbhāva*. This is an abbreviation of *vyadhikaraṇa-dharmâvacchinna-pratiyogitākâbhāva*, which is used in the text.

53.2–4. *Athêdaṃ...kevalânvayitvāt.* In the preceding two chapters G. has offered seven definitions of pervasion. He has pointed out that these definitions must be rejected because they are unsuitable for the case of

universal-positives. In such a case we cannot find a locus-of-absence-of-the-probandum, whose existence is required by the definitions; the absence of the probandum is unexampled (*aprasiddha*). We have met with this difficulty in our attempt to apply the definitions to the inference now cited at the beginning of this chapter. The probandum in this inference is 'nameableness'. Then absence of the probandum is 'absence of nameableness'. The counterpositive of this absence, nameableness, is naturally taken in the sense in which it is used as probandum, i.e. in the unqualified sense. In the technical language of Navya-nyāya we convey this sense by speaking of 'an absence the counterpositiveness to which is limited by the limitor of probandum-ness' (see p. 13). This limitor is here 'nameableness-ness'. It stands in a particular qualification relation (p. 5) to its locus 'nameableness'. Thus 'nameableness' is the term of a particular qualification relation. Now any abstract, while admitting of being the term of a particular qualification relation, is incapable of being a term of inherence (*samavāya*), since inherence exists either (1) between generic characters and the corresponding substances, qualities or actions or (2) between qualities (or actions) and substances or (3) between substances and their parts (p. 4). Thus nameableness cannot be a term of inherence, i.e. it cannot have the property of being a term of inherence (*samavāyitā*). This property, which occurs in loci different from it (*vyadhikaraṇa-dharma*), may in this connexion be called a contradictory property (Ingalls, pp. 81–82). Another example of a contradictory property is clothness in connexion with pot, for a pot can never be a cloth. If we qualify a thing by a property contradictory to it, as here the opponent does, we obtain a self-contradictory complex which cannot exist; so that its negation or absence, being universal-positive, is found in all things, for instance, in a pot. So we do have a locus of absence of nameableness (though in a qualified sense) and the fault of unexampled term will no longer arise in the case of universal-positives. Then the limitor of the counterpositiveness belonging to the absence of the probandum is, in relation to pot, not nameableness-ness, but the contradictory property 'being a term of inherence'. This use of self-contradictories is said to have been allowed by Sondaḍa (M. 53.7–8; Ingalls, p. 82, n. 186). He was probably a follower of Prabhākara. The Prābhākara school of Mīmāṃsā held that every idea as such is true.

53.4–54.2. *Na câivaṃ...ghaṭe.* If pot is a locus of absence of name-

ableness, then the reason (knowableness) will occur in a locus of absence of the probandum (nameableness), since pot is also a locus of knowableness. So we get deviation (*vyabhicāra*, p. 7), which is the contrary of pervasion. In answer to this objection the opponent says: What determines deviation of knowableness is an absence of nameableness in the strict sense, where the limitor of probandumness limits the counterpositiveness; such an absence does not occur in pot. So we have no deviation.

54.2. *tadṛśa-sādhyâbhāva.* I.e. an absence-of-the-probandum to which the counterpositiveness is limited by the limitor of probandumness. It is this absence that needs an example in the form of a locus. That this example is not found in the case of universal-positives has been conceded by the opponent.

54.4–55.2. *tad-viśiṣṭa-jñānasya. . .pratīty-āpatteḥ.* To express definitely our notion of an absence, to say for instance 'There is no pot', we must have a determinate (*savikalpaka*) knowledge of that absence. This implies that we must know the distinguishing characteristic of its counterpositive. This characteristic is the limitor of the counterpositiveness. Now every knowledge is said to be qualified (*viśiṣṭa*) by its content. Thus determinate knowledge of an absence must be qualified by this differentiating element which is the limitor of the counterpositiveness. In the example 'There is no pot' this limitor is potness, in the absence-of-the-probandum in question nameableness-ness. This excludes the assumption of a contradictory property as a limitor of the counterpositiveness.

For the distinction between determinate (*savikalpaka*) and indeterminate (*nirvikalpaka*) knowledge I may refer to Ingalls (pp. 39–40) and Foucher (pp. 108–109).

55.2. *śaśa-śṛṅga*, 'horn of a hare', i.e. an impossibility. Horn of a hare is commonly used in Indian philosophy as an example of ens rationis sine fundamento in re.

55.2. The basic text has *aprasiddheḥ*, but M. (61.11) reads *asiddheḥ*, which is also the reading of the Dīdhiti (132.1). I prefer M.'s reading.

55.3. *Śaśa-śṛṅgaṃ. . .arthaḥ.* On this question I may be allowed to quote from Ingalls (p. 61, n. 113): 'In the same way those Western logicians who object to "For all x, x is not a square triangle" as meaningless have no objection to "For all x, if x is a square, x is not a triangle".'

TRANSLITERATION, TRANSLATION AND COMMENTARY

CHAPTER IV

PRELIMINARY REFUTATION OF A SERIES OF DEFINITIONS OF PERVASION

§ 1. *Definition* (8)

69.2 *Atha sādhyâsāmānādhikaraṇyânadhikaraṇatve sati sādhikaraṇatvaṃ vyāptiḥ, kevalânvayini sādhyâsāmānādhikaraṇyaṃ niradhikaraṇe ākāśâdau prasiddham iti cet,*

70.1 *na. Sādhyâsāmānādhikaraṇyaṃ hi na sādhyânadhikaraṇâdhikaraṇatvaṃ sādhyâdhikaraṇânadhikaraṇatvaṃ vā kevalânvayini yatkiṃcit-sādhyâdhi-*

*71.1 *karaṇânanadhikaraṇe dhūme câ*vyāpteḥ.*

69.2–4. [Objection.] 'But pervasion is (8), in addition to [the reason's] being no locus of [the property of] not having common locus with the probandum, [the reason's] having a locus. In the case of universal-positives [the property of] not having common locus with the probandum is known to exist in ether and other [eternal] things that have no locus [for the relation of inherence].'

70.1–71.1. [Answer.] We do not agree, because 'not having common locus with the probandum' cannot mean either (a) 'having as locus a non-locus of the probandum' or (b) 'not having as locus a locus of the probandum', since the definition would then be so narrow as not to apply [respectively] (a) in the case of universal-positives, and (b) to smoke [when this is reason in the true inference It has fire because it has smoke]; for, whichever probandum [(fire)] you take, a smoke does not have as locus the locus of it.

69.2–4. *Atha...prasiddham.* The objection has a close connexion with chapter II: definition (8) is definition (6) to which *sādhikaraṇatva* (having a locus) has been added. The addition of this new element seems to be unnecessary since possession of a locus in common with the probandum results here from the double negation which forms the main part of the definition (cf. M. 69.8–10); yet it is to be explained by noticing that *sādhyâsāmānādhikaraṇya* is used here in the wider sense of 'not having common locus with the probandum' because this sense is logically implied

by 'not having a locus at all' and therefore is the meaning which can be illustrated by the example used (an example of 'not having a locus at all' being also an example of 'not having common locus with the probandum'). The stricter sense of 'having a locus not in common with the probandum' which *sādhyâsāmānādhikaraṇya* bears in definition (6) cannot be applied here because it necessarily involves possession of a locus. Pervasion, then, is defined as the negation of *sādhyâsāmānādhikaraṇya*, for pervasion is described as the reason's being no locus (*anadhikaraṇatva*) of the property of *sādhyâsāmānādhikaraṇya*, i.e. as the reason's non-possession of that property – which means that the property is denied of the reason. The objector now points out that the negative of that property must be used along with the property of having a locus, i.e. it must be used with the implication of 'having a locus'. Now if, and only if, one property implies another, the negation of the latter implies the negation of the former. Thus in defining pervasion the objector implicitly points out that *sādhyâsāmānādhikaraṇya* is implied in 'not having a locus at all', so that it must have the wider sense of 'not having common locus with the probandum'. This sense permits of an example for the case of universal-positives. The fault of unexampled term will no longer arise (cf. p. 61).

Another explanation of the use of *sādhikaraṇatva* might be that the objector wishes to point out merely the necessity of the reason's having a locus, in contrast with the possibility of taking as examples of 'not having common locus with the probandum' things that have no locus. In fact, if pervasion is to be possible, the reason must stand in such a relation as to really possess a locus by means of which it can be connected with the probandum.

M. (69.14–70.8) following Raghunātha (Dīdh. 251) has a different explanation with which we need not concern ourselves since his treatment of *sādhyâsāmānādhikaraṇya* as a bahuvrīhi is very unnatural.

69.4. *niradhikaraṇe ākāśâdau.* Ether (*ākāśa*) like all eternal things cannot inhere in anything and therefore cannot be related by the relation of inherence; if it stands in this relation it will be without a locus (*niradhikaraṇa*). Thus ether may serve, for every type of inference, to illustrate the property 'not having common locus with the probandum', provided that this property is expressed with no regard to the relation in which the reason stands. The relation of the reason may be contact or a particular qualification relation, but the property 'not having a locus' and therefore

also the property 'not having common locus with the probandum' is, as belonging to ether, true only if the relation attaching to the locus is inherence. Ether too can be related by contact, for ether is in contact with a pot etc.; then its locus (pot etc.) is a locus of nameableness (see p. 5), and thus it has a locus in common with the probandum in the case of universal-positives. It must be noted that the relation of inherence plays a large part in the system of Nyāya-Vaiśeṣika; it is the only relation that forms a category of its own. That may be the reason why *niradhikaraṇa* without qualification is used with reference to inherence.

70.1–71.1. *Sadhyâsāmānādhikaraṇyaṃ. . . avyāpteḥ.* In the present paragraph G.'s interpretation of *sādhyâsāmānādhikaraṇyânadhikaraṇatva* (69.2) is different from his interpretation in chapter II (49.3–50.1). There he interprets it as meaning *sādhyânadhikaraṇânadhikaraṇatva*, which is the contradictory of (a) *sādhyânadhikaraṇâdhikaraṇatva* (having as locus a non-locus of the probandum), while he here considers it to be the contradictory either of (a) or of (b) *sādhyâdhikaraṇânadhikaraṇatva* (not having as locus a locus of the probandum). The difference in interpretation may be justified by the fact that in chapter II *sādhyâsāmānādhikaraṇya* has to be treated as synonymous with *sādhya-vaiyadhikaraṇya*, which can only mean (a) (see p. 65); in the present paragraph there is no question of substituting *vaiyadhikaraṇya* for *asāmānādhikaraṇya*, both (a) and (b) can be the meaning of *sādhyâsāmānādhikaraṇya*. We have translated this word in definition (6) by (1) 'having a locus not in common with the probandum' and in definition (8) by (2) 'not having common locus with the probandum'. These are the two possible meanings, in accordance with M.'s interpretation of *-asāmānādhikaraṇya* as meaning either *tad-adhikaraṇa-vṛttitvâbhāva* (absence of occurrence-in-its-locus) or *tad-anadhikaraṇa-vṛttitva* (occurrence in its non-locus) (M. 69.6–8). (1) expresses the same as (a) (having as locus a non-locus of the probandum). Since no quantifier is used, (a) may mean either (c) 'having as one of its loci a non-locus of the probandum' or (d) 'having as all of its loci non-loci of the probandum'. (2) expresses the same as (b) (not having as locus a locus of the probandum). This may mean either (e) 'not having as one of its loci a locus of the probandum' or (f) 'not having as all of its loci loci of the probandum'. (c) logically implies (f) and similarly (d) implies (e), but not vice versa, since (e) and (f) are implied by 'not having a locus at all', but (c) and (d) are not.

(I) If definition (8) expresses, as definition (6) does, the contradictory of (c), pervasion will be correctly defined as the reason's not having as one of its loci a non-locus of the probandum; the reason is supposed to have a locus. But the definition will suffer from the fault of unexampled term (see p. 61), since a non-locus of the probandum cannot be found in the case of universal-positives.

(II) If definition (8) expresses the contradictory of (f), pervasion will be correctly defined as the reason's not not having as all of its loci loci of the probandum. There will be no unexampled term, since an example of 'not having a locus at all' can serve as an example of 'not having as all of its loci loci of the probandum'. But in G.'s view the definition is still unsound, because 'probandum' may be taken to stand for 'instance of the probandum'. This confusion, as we saw in chapter II (note on 49.2–50.2), takes place when the probandum is a class containing several members or individuals (*nānā-vyakti*, see p. 5). Then in the example of smoke and fire we replace 'fire' by 'a fire' and 'smoke' by 'a smoke'. A smoke (mountain smoke) is not in the kitchen, the locus of a fire (kitchen fire); a smoke (kitchen smoke) is not on the mountain, the locus of a fire (mountain fire). Further, all smoke is not in red-hot iron, the locus of a fire (red-hot iron fire). Thus whichever fire (probandum) I take, a smoke does not have as its locus the locus of it. The opposite of the definition applies in the true inference It has fire because it has smoke. The definition is too narrow (*avyāpti*, nonpervasion, see p. 10).

70.2–3. *kevalânvayini.* G. omits here to mention the second reason why, if we adopt (a), the definition fails – which he has mentioned in chapter II (50.1–2). The omission is unimportant since one counter-instance suffices to refute a definition.

In symbolic language 'not having common locus with the probandum' in the sense of 'not having as locus a locus of the probandum' (*sādhyâdhikaraṇânadhikaraṇatva*) may be represented by

(1)
$$\begin{aligned}&\sim(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \vee \\ &\vee \sim\{(x)\,[(Ey)\,(Ay \wedge Ryx) \rightarrow (Ey)\,(By \wedge Syx)] \wedge \\ &\wedge (Ex)\,(Ey)\,(Ay \wedge Ryx)\}.\end{aligned}$$

'Having a locus not in common with the probandum' in the sense of

'having as locus a non-locus of the probandum' (*sādhyânadhikaraṇâdhikaraṇatva*) is

(2) $(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (y)\,(By \rightarrow \sim Syx)] \vee$
$\vee \{(x)\,[(Ey)\,(Ay \wedge Ryx) \rightarrow (y)\,(By \rightarrow \sim Syx)] \wedge$
$\wedge (Ex)\,(Ey)\,(Ay \wedge Ryx)\}.$

'Not having a locus at all' is

(3) $\sim (Ex)\,(Ey)\,(Ay \wedge Ryx).$

(3) and (2) imply (1) since

(4) $\perp (1) \leftrightarrow [(2) \vee (3)].$

This is clear from

(5) $\perp (\sim (Ex)\,(p \wedge q) \leftrightarrow \{[(x)\,(p \rightarrow \sim q) \wedge (Ex)\,p] \vee \sim (Ex)\,p\}) \wedge$
$\wedge (\sim [(x)\,(p \rightarrow q) \wedge (Ex)\,p] \leftrightarrow [(Ex)\,(p \wedge \sim q) \vee \sim (Ex)\,p]).$

The contradictory of (1) is

(6) $(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \wedge$
$\wedge \{(x)\,[(Ey)\,(Ay \wedge Ryx) \rightarrow (Ey)\,(By \wedge Syx)] \wedge$
$\wedge (Ex)\,(Ey)\,(Ay \wedge Ryx)\}.$

(6) is equivalent to the formula of pervasion (p. 32)

(7) $(x)\,[(Ey)\,(Ay \wedge Ryx) \rightarrow (Ey)\,(By \wedge Syx)] \wedge (Ex)\,(Ey)\,(Ay \wedge Ryx).$

The contradictory of (2) is

(8) $(x)\,[(Ey)\,(Ay \wedge Ryx) \rightarrow (Ey)\,(By \wedge Syx)] \wedge$
$\wedge \{(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \vee$
$\vee \sim (Ex)\,(Ey)\,(Ay \wedge Ryx)\}.$

(8) is equivalent to the formula of pervasion

(9) $(x)\,[(Ey)\,(Ay \wedge Ryx) \rightarrow (Ey)\,(By \wedge Syx)].$

The statement of the form 'Whichever fire (=B) you take, a smoke (=A) does not have as locus the locus of it' corresponds to

(10) $(y)\,\{By \rightarrow (Ez)\,[Az \wedge \sim (Ex)\,(Rzx \wedge Syx)]\} \wedge (Ey)\,By.$

(10) is implied by

(11) $\sim(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \wedge (Ey)\,Ay \wedge (Ey)\,By.$

since

(12) $\perp\{\sim(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \wedge$
$\wedge (Ey)\,Ay \wedge (Ey)\,By\} \rightarrow ((y)\,\{By \rightarrow (Ez)[Az \wedge$
$\wedge \sim(Ex)\,(Rzx \wedge Syx)]\} \wedge (Ey)\,By).$

Proof.

(13) $\perp\{\sim(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \wedge$
$\wedge (Ey)\,Ay \wedge (Ey)\,By\} \leftrightarrow (\sim(Ey)\,\{By \wedge (Ez)\,[Az \wedge$
$\wedge (Ex)\,(Rzx \wedge Syx)]\} \wedge (Ey)\,Ay \wedge (Ey)\,By)$

(14) $\ldots \leftrightarrow ((y)\,\{By \rightarrow (z)\,[Az \rightarrow \sim(Ex)\,(Rzx \wedge Syx)]\} \wedge$
$\wedge (Ey)\,Ay \wedge (Ey)\,By)$

(15) $\ldots \rightarrow ((y)\,\{By \rightarrow (Ez)\,[Az \wedge \sim(Ex)\,(Rzx \wedge Syx)]\} \wedge (Ey)\,By)$

§ 2. *Definition* (9)

71.1 *Nâpi sva-samānâdhikaraṇâtyantâbhāvâpratiyogi-sādhya-sāmānādhikara-ṇyaṃ parvatīya-vahner mahānasīya-dhūma-samānâdhikaraṇâtyantâbhāva--pratiyogitvāt, dravyatvâder avyāpya-vṛtty-avyāpyatâpatteś ca. Na ca prati-*
*72.1 *yogi-viro*dhitvaṃ vyāpya-vṛttitvaṃ vā abhāva-viśeṣaṇaṃ deyaṃ saṃ-yogâdau sādhye sattvâder anaikāntikatvâbhāva-prasaṅgāt. Na hi pratiyogi--virodhī saṃyogâder aparo'tyantâbhāvo'sti, adhikaraṇa-bhedenâbhāva--bhedâbhāvāt.*

71.1–72.4. Nor [can pervasion be] (9) [the reason's] having a common locus with the probandum which is not the counterpositive of a constant absence which has a common locus with the reason. For (a) mountain fire is the counterpositive of a constant absence which has a common locus with kitchen smoke; [so the definition would not apply in the true inference 'It has fire because it has smoke'.] And (b) substanceness etc. would not be pervaded by that which is of incomplete occurrence. [In trying to avoid (b)] we must not attach to 'absence' the qualification 'being contradictory to its counterpositive' or 'being of complete occurrence';

for that would involve us in admitting that in a [false] inference with contact as probandum [and reality as reason] reality is not casually [but uniformly] associated with contact [so that the false inference would appear true. We cannot avoid this overpervasion], for there is no other absence of contact which would be contradictory to its counterpositive, since absences do not differ as their loci differ.

71.1. *atyantâbhāva*, 'constant absence', p. 8.

71.2–3. *parvatīya-vahner...-pratiyogitvāt.* If we consider the true inference 'It has fire because it has smoke', we find that some instance (mountain fire) of the probandum (fire) is absent from the kitchen, which is the locus of some instance (kitchen smoke) of the reason (smoke). This at first sight conflicts with the statement of definition (9) that the probandum is not absent from a locus of the reason. The definition is therefore unsound.

The statement that the probandum should not be absent from a locus of the reason must be taken to be the negation either of (1) the fact just considered, that the reason has a locus from which some instance of the probandum is absent, or of (2) the fact that the reason has a locus from which any instance of the probandum is absent. Since (2) implies (1), the negation of (1) implies the negation of (2). Thus definition (9) may mean that the reason has no locus from which *any* instance of the probandum is absent. If, with M. (71.16–18), we interpret the definition in this way, we shall have no difficulty in applying the definition to the true inference 'It has fire because it has smoke', for the kitchen is obviously not a place from which all fire is absent; the definition will be logically correct, since there is no locus of the reason from which any instance of the probandum is absent. The difficulty just considered (a) will therefore no longer exist. This is, according to M., the reason why G. passes to a second difficulty (b).

71.3–4. *dravyatvâder...ca.* G. points to an inference about incomplete occurrence (*avyāpya-vṛtti*), viz. the true inference 'It has contact because it is a substance' (*saṃyogī dravyatvāt*). The probandum (contact) is there of incomplete occurrence (see p. 9), and so will be its absence. In every substance, A, we find both contact (a quality), through A's being somewhere in contact with another substance, B, and absence of contact, through A's being somewhere not in contact with B. The typical example is the tree whose branches are in contact with a monkey, but whose roots

are not; the tree is both a locus of contact with a monkey and a locus of absence of contact with a monkey. In the above inference the reason (substanceness) will therefore have a locus (substance) from which any instance of the probandum (contact) is absent. This contradicts definition (9), since, as we saw in the preceding note, the definition may mean that the reason has no locus from which any instance of the probandum is absent. The definition must then be rejected, because otherwise, the inference being false, substanceness would not be pervaded by that which is of incomplete occurrence, viz. contact.

dravyatvâdi, substanceness etc., i.e. substanceness and abstracts of particular substances such as this-treeness, which is reason in the inference 'It has contact with a monkey because it is this tree' (*kapi-saṃyogy etad-vṛkṣatvāt*). Similarly *saṃyogâdi* (72.1), 'contact etc.', i.e. contact and its specifications such as contact with a monkey. (When *-ādi* is used in this sense, we shall often not translate it.)

71.4–72.4. *Na ca...âbhāvāt.* In general the (constant) absence (*atyantâbhāva*) of a thing A is thought of as the contradictory of the presence of A or, to use the language of G., as being contradictory to its counterpositive A in relation to the same locus, so that absence and presence of A cannot occur in the same locus. But if A is contact, we are supposed to have a locus, necessarily a substance, in which both presence and absence of A occur. Then absence of A does not exclude presence of A in the same locus; absence of A occurs in the locus of its counterpositive A. Thus the term *atyantâbhāva* (constant absence) lets in ambiguity and this gives rise to the difficulty (b) explained in the previous note. In order to avoid this difficulty one might require the absence used in the definition to be qualified by the property of being contradictory to its counterpositive (or, which means the same, of being of complete occurrence) with regard to any locus. Such absence of contact cannot exist; the definition then will be applicable to the true inference 'It has contact because it is a substance.' But now comes another difficulty. The definition will then apply, not only in the true inference 'It has contact because it is a substance', but also in any false inference with contact as probandum like 'It has contact because it has reality' (*saṃyogī sattvāt*), where the reason (reality) has a common locus (substance) with the probandum; here too the probandum is not the counterpositive of a constant absence supposed to be contradictory to its counterpositive and having a common locus

with the reason. Thus the definition will be too wide; in other words, there will be overpervasion (*ativyāpti*, see p. 10).

The overpervasion will, however, not take place if we assume a particular absence of contact contradictory to its counterpositive and occurring in things other than substance. This particular absence should be distinguished from the absence of contact just considered, which may coexist with its counterpositive and occurs in both substances and other things. Such a particular absence of contact whose characteristics are 'being contradictory to its counterpositive' and 'being of complete occurrence' occurs in loci of reality, viz. qualities and actions; so that definition (9) using this absence will not be so wide as to apply in the false inference 'It has contact because it has reality'. But G. does not recognize two types of absence of contact. In his view an absence of a thing must be conceived as a unit not admitting of varieties according to its loci. The theory that absences differ as their loci differ is discussed by M. in his commentary on definition (2) (40.3–41.10; Ingalls, pp. 127–133). M. finally accepts this theory, but limits its application to absence of contact. A synopsis of the two theories may be the following:
c. = counterpositive

A. G.'s theory:

Absence I: *Absence in general*, capable of occurring *in any locus*; contact *can* be its c..
(a) If its c. is contact,
  (α) in substance, I is not contradictory to its c;
  (β) in loci other than substance, I is contradictory to its c.. (cf. 136.1)
(b) If its c. is not contact, I = II.
Absence II: *Absence contradictory to its c.*, capable of occurring *in any locus*; contact *cannot* be its c. because of I (a) (α).
I and II do not differ in locus.

B. Theory that absences differ as their loci differ

Absence I: as Absence I under A.
(a) If its c. is contact,
  (α) in substance, I is not contradictory to its c.;
  (β) in loci other than substance, I = III.
(b) If its c. is not contact, I = II.

Absence II: as Absence II under A.
Absence III: *Absence contradictory to its c.*, capable of occurring only *in loci other than substance*, contact *can* be its *c.*.
III differs in locus from I and II.

72.2. *anaikântikatva*, 'being capable of being thus and of being not thus.' M. identifies it with deviation (*vyabhicaritatva*, 73.3), i.e. the occurrence of the reason in loci other than those of the probandum (see p. 7). Reality is only 'casually', i.e. in part of its loci (in so far as one of its loci is substance), associated with contact, so that it may be accompanied by contact and may not be accompanied by contact. If the inference 'It has contact because it has reality' were true, reality would always be accompanied by contact, and conversely, if reality were always accompanied by contact, the inference 'It has contact because it has reality' would be true.

In a symbolic representation of the logical structure, supposing the absence of a thing to be truly opposed to its presence, definition (9) prima facie appears as the following formula:

(1) $$(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \wedge \wedge \sim(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge \sim Syx)].$$

In the inference 'It has fire because it has smoke' the contradictory of the second part of (1)

(2) $$(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge \sim Syx)]$$

is true, because an instance (mountain fire) of fire (=B) is the counterpositive of a constant absence which has a common locus (kitchen) with an instance (kitchen smoke) of smoke (=A).
But definition (9) may also mean (M. 71.16–18)

(3) $$(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \wedge \wedge \sim(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (y)\,(By \rightarrow \sim Syx)].$$

(3) is equivalent to the formula of pervasion (see p. 32):

(4) $$(x)\,[(Ey)\,(Ay \wedge Ryx) \rightarrow (Ey)\,(By \wedge Syx)] \wedge (Ex)\,(Ey)\,(Ay \wedge Ryx).$$

(5) $$\perp (1) \rightarrow (3)$$

§ 3. *Definition* (10)

72.4 *Nâpi sādhanavan-niṣṭhânyonyâbhāvâpratiyogi-sādhyavatkatvaṃ vyāptiḥ,*
*73.1 *mūle * vr̥kṣaḥ kapi-saṃyogavān nêty abādhita-pratīteḥ, tad-anyonyâbhāva-*
*74.1 *syâpi tatra sattvāt (Na câivaṃ bhedâbhedaḥ, avacchedaka-bhedena *tat-*
-sattvâbhyupagamāt.), sādhanavan-niṣṭhânyonyâbhāvâpratiyogi sādhyavad
yasyêti ṣaṣṭhy-artha-vyāpya-vyāpaka-bhāvânirūpaṇāt, sādhya-sādhanayor
vyāpti-nirūpyatvāt, vahnimat-parvatasya dhūmavan-mahānasa-niṣṭhânyo-
*75.1 *nyâbhāva-pratiyogitvāc ca *viśeṣâbhāva-kūṭād evâbhāva-vyavahārôpapattau*
sāmānyâbhāve mānâbhāvāt.

72.4–75.2. Nor [can pervasion be] (10) [the probans'] possession of a locus-of-the-probandum which is not the counterpositive of a mutual absence residing in a locus of the probans. For (1) [in the case of the true inference It has contact with a monkey because it is this tree] there is mutual absence of locus of the probandum in the tree, since no one can set aside the distinct knowledge that in its roots the tree has no contact with a monkey. (The objection that on this assumption difference would be non-difference is unjustified, since difference and non-difference must be understood as being determined by different limitors.) Further, (2) the genitive ['whose'] in [the analysis] 'whose locus of the probandum is not the counterpositive of a mutual absence residing in a locus of the probans' signifies the relation of pervader and pervaded, which has not yet been examined [but is definiendum]. Besides, (3) [the terms] probans and probandum can only be described with the help of pervasion. Finally, (4) [in the case of the true inference 'It has fire because it has smoke' we find that] the mountain, which is a locus of fire, is the counterpositive of a mutual absence residing in the kitchen, which is a locus of smoke. There is no evidence that there is [apart from the particular absences] a universal absence; the fact that we speak of absence is merely the result of [its being] a product of particular absences.

72.4–75.2. According to G. definition (10) suffers from two faults: (a) It offends against the rule that the definitum should not enter into the definition. This fault is shown to occur twice (in (2) and in (3)). (b) The definition is too narrow: G. mentions two types of case (in (1) and in (4)) where the definition fails to apply. This is the fault of non-

pervasion (*avyāpti*, p. 10), due to ambiguity of the definitory formula.

72.4–5. *sādhanavan-...vyāptiḥ*. This definition differs from the preceding definitions in that it is formulated as an abstract of a bahuvrīhi (possessive compound) with the suffix *ka*. Its understood subject is the same as that of the other definitions, viz. the reason, which is called probans (*sādhana*). But this subject is here, through the bahuvrīhi with *-ka*, related positively to locus of the probandum, whereas this locus is related negatively to an absence residing in a locus of the probans. The positive relation may be regarded as a kind of pervasion. That is one of the reasons why G. rejects definition (10), since then the definition offends against the rule that the definitum should not be introduced into the definitory formula. Later (145.1–2), however, when he gives correct definitions of pervasion, he accepts the formulation by means of a bahuvrīhi with *-ka*, arguing that its meaning can be understood without knowing pervasion as such.

72.4. *sādhana*, 'probans'. In the theory of pervasion this word is synonymous with *hetu* (reason).

72.5. *anyonyâbhāva*, 'mutual absence', p. 8.

72.5–73.2. *mūle...sattvāt*. We have seen in the preceding paragraph how contact and absence of contact coexist in the same substance and do not exclude each other. The view adopted here (cf. ch. VII, § 2) is that in its branches the tree is a locus of contact with a monkey, while in its roots it is not. Thus we have the statement (a) 'The tree is a locus of a mutual absence whose counterpositive is locus of contact with a monkey'. This prevents definition (10) from applying in the true inference 'It has contact with a monkey because it is this tree' (*kapi-saṃyogy etad-vṛkṣatvāt*), where 'contact with a monkey' is probandum and this tree locus of the probans 'this treeness'. For we can say, by substituting in the statement (a) 'locus of the probans' for 'tree' and 'probandum' for 'contact with a monkey', that the locus of the probans is a locus of a mutual absence whose counterpositive is locus of the probandum. This is equivalent to saying that locus of the probandum is the counterpositive of a mutual absence residing in a locus of the probans. This is contradictory to definition (10). The definition is therefore too narrow.

73.2. *bhedâbheda*, a karmadhāraya (descriptive compound) in the sense of 'difference that is non-difference'. The objection is: If the tree which is identical with a locus of contact with a monkey is different from such a

locus, difference would be identity, i.e. non-difference – which would be a breach of the law of contradiction.

73.2. *avacchedaka* (limitor) has here the meaning of *sīmā-paricchedaka* (delimitor of the physical boundary). Limitors in this sense are branches and roots. The branches of the tree are made limitor of locusness to contact with a monkey, which locusness resides in the tree; the roots of the tree are made limitor of locusness to mutual absence of locus of contact with a monkey, which locusness resides in the tree. Thus, (a) the tree is a locus of contact with a monkey, provided that the locusness is limited by the branches; on the other hand, (b) the tree is a locus of mutual absence of locus of contact with a monkey, provided that the locusness (to the mutual absence) is limited by the roots. We say that (a) the tree is in its branches a locus of contact with a monkey, and (b) the tree is in its roots no locus of contact with a monkey. In (a) the tree is not different from locus of contact with a monkey, in (b) the tree is. But since difference and non-difference depend on the limitors, there is, on this interpretation, no breach of the law of contradiction. Cf. Ingalls, pp. 73–74.

74.1–2. *sādhanavan-. . .yasyêti*, 'whose locus of the probandum is not the counterpositive of a mutual absence residing in a locus of the probans.' This is the analysis of the compound *sādhanavan-niṣṭhânyonyâbhāvâprati-yogi-sādhyavatka*, which followed by *-tva* forms definition (10). The compound is a bahuvrīhi with the suffix *ka* as samāsānta (suffix attached to the end of a compound); it is analysed with the help of the genitive case of the relative (*yasya*). The genitive expresses the same relation as the suffix *ka*, which according to M. (73.21) has the meaning of the suffix *mat*, which expresses possession (Pāṇini 5.2.94). The subject, which is understood as the antecedent of *yasya*, is the reason (probans). Thus the reason is pronounced to be possessor of a locus-of-the-probandum which is not the counterpositive of a mutual absence residing in a locus of the probans. This seems to mean that locus-of-the-probandum thus qualified is predicable of the loci of the reason. M. (73.21–74.10) interprets it as meaning either that the reason is pervaded directly by locus-of-the-probandum thus qualified, or that it is pervaded by the probandum belonging to that locus. Thus in order to understand the meaning of definition (10) we must know beforehand what 'being pervaded by' is; this requires a knowledge of the relation of pervader and pervaded; but this knowledge cannot be supplied, since the nature of pervasion has not yet been determined, but

is the very object of our present inquiry. The definition must therefore be rejected.

74.3. *sādhya-...-nirūpyatvāt. sādhana* means probans, i.e. proving *something*; it indicates a necessary connexion with an object, viz. the probandum (*sādhya*). Now this connexion is the relation of pervasion. Thus the use of the terms 'probans' and 'probandum' involves a knowledge of pervasion and is therefore not allowed. The same will be pointed out in 91.2 (§ 12), where G. calls the fault *ātmâśraya* ('foundation upon the thing itself', p. 10). (The same could of course be said when we use as names reason (*hetu*) and probandum; but then the correlation of the terms is not expressly assumed since their names are not derived from the same root.)

74.3–4. *vahnimat-...-pratiyogitvāc ca.* G. shows that definition (10) does not cover the pervasion of smoke by fire. We have seen that the same happened to some of the preceding definitions. The fault here arises from not quantifying properly locus of the probandum. It is true that in any locus of smoke (probans), kitchen etc., there is a mutual absence of *some* locus of fire (probandum), viz. mountain etc., – i.e. that any locus of smoke is not a particular locus of fire, e.g. that the kitchen is not a mountain; but it is not true that in a locus of smoke there is a mutual absence of *every* locus of fire – i.e. that a locus of smoke is not a locus of fire, e.g. that the kitchen is not a locus of fire.

75.1–2. *viśeṣâbhāva-...mānâbhāvāt.* If the mutual absence in definition (10) is taken to be not a particular absence whose counterpositive is a particular locus of the probandum, but a general absence whose counterpositive is the set of all loci of the probandum, then the definition will be applicable to the pervasion of smoke by fire. This has been shown in the preceding note. Now the question arises: Which absence do we mean when we speak of absence? We may mean by it a general absence, i.e. an absence having for its counterpositive the class (in the present case locus-of-the-probandum). Such an absence is formed by the product (*kūṭa*, 'heap') of the particular absences each of which has for its counterpositive a member of the class (in the present case a particular locus-of-the-probandum). Thus we do not need for its formation a distinct universal absence (*sāmānyâbhāva*); it is enough that we conjoin all the particular absences (*viśeṣâbhāva*), since their product will be identical with the general absence. Consequently, there is no reason for treating the mutual absence in the definition as being necessarily a universal absence to be

distinguished from particular absences; the absence is always one whose counterpositive consists of loci of the probandum, and these loci may be taken either singly or collectively. Thus the definition lets in ambiguity.

The question whether we need a universal absence as distinct from particular absences will be treated again in a special chapter on universal absence (chapter VI), which follows upon the conclusive definition of pervasion. G.'s view is there the opposite of what he maintains here. He here adopts the opinion of those who reject a universal absence as unnecessary. The whole matter will become clearer when he considers pervasion between particulars (chapter VII, § 1).

Definition (10) may be represented symbolically, if we take the mutual absence to be a general absence, by the formula

$$(1)\qquad (Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \wedge$$
$$\wedge \sim (Ex)\,\{(Ey)\,(Ay \wedge Ryx) \wedge (w)\,[(Ey)\,(By \wedge Syw) \rightarrow (w \neq x)]\}.$$

(1) is equivalent to the formula of pervasion:

$$(2)\qquad (x)\,[(Ey)\,(Ay \wedge Ryx) \rightarrow (Ey)\,(By \wedge Syx)] \wedge (Ex)\,(Ey)\,(Ay \wedge Ryx).$$

That the product of all particular absences is identical with the corresponding general absence is shown by the formula

$$(3)\qquad \perp [(A \cup B \cup C \cup \ldots) = F] \rightarrow$$
$$\rightarrow (x)\,\{[(y)\,(Ay \rightarrow \sim Ryx) \wedge (y)\,(By \rightarrow \sim Ryx) \wedge$$
$$\wedge (y)\,(Cy \rightarrow \sim Ryx) \wedge \ldots] \leftrightarrow (y)\,(Fy \rightarrow \sim Ryx)\}$$

where A, B, C ... stand for the members (or sub-classes) of the class F, which is the counterpositive of the general absence. R may be Identity, so that the formula covers both constant absences and mutual absences. In the case of mutual absence the formula takes the form

$$(4)\qquad \perp [(A \cup B \cup C \cup \ldots) = F] \rightarrow [(\bar{A} \cap \bar{B} \cap \bar{C} \cap \ldots) = \bar{F}].$$

§ 4. *Definition* (11)

75.2 *Nâpi sādhana-samānâdhikaraṇa-yāvad-dharma-nirūpita-vaiyadhikaraṇyân-*
*76.1 *adhikaraṇa-sādhya-sāmā*nādhikaraṇyaṃ sādhana-samānâdhikaraṇasya prameyatvâder vaiyadhikaraṇyâprasiddheḥ, mahānasâdau samavāyitayā*

*77.1 *vahni-vahnimator atyantânyonyâbhāvayoḥ sattvāt, dhūmâ*dav apy ukta-*
-lakṣaṇâbhāvāc ca.

75.2–77.1. Nor [can pervasion be] (11) [the probans'] having a common locus with the probandum which is no locus of [the property of] differing in locus [from so-and-so] if this [property] is described by all the attributes that have a common locus with the probans. For (1) 'differing in locus [from so-and-so]' is unexampled for [the case in which it is described by] 'being object of knowledge' or other [unnegatable] properties that have a common locus with the probans. And (2) the characteristic given as definition fails to apply even to smoke and other things [as subjects, which are probans in a true inference like It has fire because it has smoke], since there is in the kitchen etc. a constant absence of fire as well as a mutual absence of locus of fire when the locus [of fire, fire being one of the attributes which have a common locus with the probans,] is a term of inherence.

75.2–3. *sādhana-*. . . *sādhya-*. This must mean that the probandum has some locus identical with a locus of so-and-so, so-and-so being any of the attributes that have a common locus with the probans.

75.2–3. *sādhana-*. . . *-nirūpita-*. The phrase 'the probans' having a common locus with the probandum which is no locus of the property of differing in locus from so-and-so' becomes a definition of pervasion if we can replace 'so-and-so' by any of the attributes that have a common locus with the probans. For the use of *nirūpita* (described by) in connexion with abstract properties, see Ingalls, pp. 46–47.

75.3. *dharma*, 'attribute'. By this the author of definition (11) seems to mean primarily a generic or specific character inhering in a locus of the probans (M. 76.9, 15). Such characters are, when the probans is smoke, substanceness, mountainness, kitchenness. The last two reciprocate with a locus of smoke, respectively mountain and kitchen, since mountain smoke and kitchen smoke are, as individual cases of smoke, related each to the corresponding specific locus (p. 4). An enumeration of all the specific characters such as mountainness, kitchenness etc., which have each a one-one correspondence to a different locus of smoke, will therefore be an implicit enumeration of all the loci of smoke. The definition then implicitly says that the probandum (fire) must have among its loci all

the loci of the probans (smoke) – which is the condition for the probans' being pervaded by the probandum. Thus pervasion is correctly defined.

75.3. *-vaiyadhikaraṇyânadhikaraṇa*, 'which is no locus of the property of differing in locus from so-and-so', i.e. which does not have all of its loci different from locus of so-and-so, i.e. which has some locus identical with a locus of so-and-so. *vaiyadhikaraṇya* is used in the strict sense of 'having the locus, i.e. all of its loci, different from locus of so-and-so'.

76.1–2. *sādhana-...-aprasiddeḥ*. We cannot find a locus different from locus of so-and-so if 'so-and-so' is replaced by 'being object of knowledge' as one of the attributes that have a common locus with the probans. 'Being object of knowledge' (*prameyatva*) necessarily belongs to everything, for everything is object of knowledge. The same applies to the other 'unnegatable' properties (universal-positives, *kevalânvayin*, p. 5), such as 'knowableness' (*jñeyatva*) and 'nameableness' (*vācyatva*). Thus definition (11) suffers from the fault of unexampled term (*aprasiddhi*, p. 18).

76.2–77.1. *mahānasâdau...ukta-lakṣaṇâbhāvāc ca.* Fire is probandum in the true inference It has fire because it has smoke. But fire is also among the attributes which have a common locus with the probans (smoke) and therefore are to replace 'so-and-so' in 'differing in locus from so-and-so'. As a value for 'so-and-so' fire may have any relation which it is capable of standing in. Now fire can be related, not only by contact, which is the relation of fire as probandum, but also by inherence; for fire inheres in the particles of fire. Standing in the relation of inherence fire is absent from the kitchen and other loci to which it is related by contact. Thus we can either say that there is a constant absence of fire in the kitchen etc. or say that there is a mutual absence of locus of fire in the kitchen etc.. Then the probandum 'fire', whose relation is contact, has no locus identical with a locus of so-and-so if so-and-so (1) stands in the relation of inherence and (2) stands for fire, fire being an attribute that, by contact, has a common locus with the probans 'smoke'. Thus it is untrue to say that fire has a locus identical with a locus of so-and-so, where 'so-and-so' can be replaced by any of the attributes that have a common locus with smoke. The definition therefore fails to apply in the true inference It has fire because it has smoke.

76.2. *samavāyitayā*, 'with the property of being a term of inherence', i.e. when the locus (of fire) has the property of being a term of inherence, i.e. when the attribute (fire) stands in the relation of inherence.

76.3–77.1. *dhūmâdāv apy ukta-lakṣaṇâbhāvāc.* If the definition does not cover the pervasion of smoke by fire, then smoke cannot be one of the subjects of the characteristic that is given as definition (cf. p. 6).

A symbolic representation of definition (11) is the following formula:

(1) $(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \wedge$
$\wedge\,(z)\,\{(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge Tzx] \rightarrow$
$\rightarrow \sim (x)\,(w)\,[((Ey)\,(By \wedge Syx) \wedge Tzw) \rightarrow (x \neq w)]\}.$

Pervasion (p. 32) is

(2) $(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \wedge$
$\wedge\,(x)\,[(Ey)\,(Ay \wedge Ryx) \rightarrow (Ey)\,(By \wedge Syx)].$

If the relation T is taken to be a one-one relation such as exists between a thing and its own proper character, e.g. the relation between kitchen and kitchenness (such a relation would be in Navya-nyāya a particular qualification relation or a peculiar relation, cf. p. 5), then (1) is equivalent to (2). This is proved as follows:

Data.

(3) $(w)\,(x)\,(y)\,[(Tyw \wedge Tyx) \rightarrow (x = w)]$

(4) $(x)\,[(Ey)\,(Ay \wedge Ryx) \rightarrow (Ez)\,Tzx]$

Proof.

(5) $\perp (z)\,\{(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge Tzx] \rightarrow (Ex)\,[(Ey)\,(By \wedge Syx) \wedge$
$\wedge\,Tzx]\} \rightarrow (z)\,(x)\,\{[(Ey)\,(Ay \wedge Ryx) \wedge Tzx] \rightarrow$
$\rightarrow (Ew)\,[(Ey)\,(By \wedge Syw) \wedge Tzw \wedge Tzx]\}$

From (5) and (3) we obtain

(6) $(z)\,\{(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge Tzx] \rightarrow$
$\rightarrow (Ex)\,[(Ey)\,(By \wedge Syx) \wedge Tzx]\} \rightarrow$
$\rightarrow (z)\,(x)\,\{[(Ey)\,(Ay \wedge Ryx) \wedge Tzx] \rightarrow$
$\rightarrow (Ew)\,[(Ey)\,(By \wedge Syw) \wedge (x = w)]\}.$

(7) $\perp (z)\,(x)\,\{[(Ey)\,(Ay \wedge Ryx) \wedge Tzx] \rightarrow$
$\rightarrow (Ew)\,[(Ey)\,(By \wedge Syw) \wedge (x = w)]\} \rightarrow$
$\rightarrow (x)\,\{(Ez)\,[(Ey)\,(Ay \wedge Ryx) \wedge Tzx] \rightarrow (Ey)\,(By \wedge Syx)\}$

(8) $\perp(1)\rightarrow(z)\{(Ex)[(Ey)(Ay \wedge Ryx) \wedge Tzx]\rightarrow$
$\rightarrow(Ex)[(Ey)(By \wedge Syx) \wedge Tzx]\}$

From (8), (6), (7) and (4) we obtain

(9) $(1)\rightarrow(x)[(Ey)(Ay \wedge Ryx)\rightarrow(Ey)(By \wedge Syx)]$.

(10) $\perp(x)[(Ey)(Ay \wedge Ryx)\rightarrow(Ey)(By \wedge Syx)]\rightarrow$
$\rightarrow(z)\{(Ex)[(Ey)(Ay \wedge Ryx) \wedge Tzx]\rightarrow$
$\rightarrow(Ex)[(Ey)(By \wedge Syx) \wedge Tzx]\}$

(11) $\perp(z)(Ex)[(Ey)(By \wedge Syx) \wedge Tzx]\rightarrow$
$\rightarrow(z)\sim(x)(w)\{[(Ey)(By \wedge Syx) \wedge Tzw]\rightarrow(x \neq w)\}$

From (9), (10) and (11) we infer that (1) is equivalent to (2).

§ 5. *Pervasion defined as a connexion without an accident* (*definitions* (12) *and* (13))

77.1 *Athânaupādhikaḥ saṃbandho vyāptiḥ, upādhiś ca sādhya-vyāpakatve sati sādhanâvyāpakaḥ, vyāpakatvaṃ tu tadvan-niṣṭhâtyantâbhāvâpratiyogitvaṃ,*
*78.1 *vyabhicāre câvaśyam upādhiḥ, pratiyogitvaṃ na virodhitvaṃ sahâ*nava-sthāna-niyama-lakṣaṇaṃ gotvâśvatvayor atathātvāt, anyonyâbhāva-prati-yoginy asattvāc ca. Kiṃ tu yathâdhikaraṇâbhāvayoḥ svarūpa-viśeṣaḥ saṃ-*
*79.1 *bandhaḥ, tathā pratiyogitvam ⟨anu*yogitvam⟩ api, abhāva-virahâtmatvaṃ vêti cet,*

yatkiṃcit-sādhya-vyāpaka-sādhanâvyāpaka-dharma-niṣedho na dhūmâ-dau, prakṛta-sādhya-vyāpaka-sādhanâvyāpaka-dharmaś ca siddhy-asiddhi-bhyāṃ na niṣeddhuṃ śakyaḥ,
*80.1 *yāvat-sādhya-vyāpake prameyatvâdau sādha*nâvyāpakatvaṃ yāvat-sādha-nâvyāpake ca ghaṭatvâdau sādhya-vyāpakatvaṃ niṣidhyata iti cet,*

na. Vyadhikaraṇatvāt.

Yāvat-sādhanâvyāpakam avyāpakaṃ yat-sādhyasya, yāvat-sādhya-vyā-pakaṃ vyāpakaṃ vā yasya tattvaṃ tad iti cet,
*81.1 *na. Sopādher api *tathātvāt, tathā hi sādhanasya vahner avyāpakaṃ yāvad--ārdrêndhanaṃ tat pratyekam avyāpakaṃ sādhya-dhūmasya, dvitīye sādhya--dhūmasya vyāpakam ārdrêndhanaṃ tat vyāpakaṃ mahānasīya-vahneḥ.*
82.1 *Nâpi sādhyaṃ yavad-avyabhicāri tad-avyabhicāritvam anaupādhikatvam, sādhyâvyabhicāritvasyâiva gamakatva-saṃbhavāt, tac ca dūṣitam.*

77.1–79.1. [The opponent:] 'Pervasion is rather (12) a connexion independent of an accident. An accident is that which is a pervader of the probandum without being a pervader of the probans; "being a pervader [of a thing]" means "not being the counterpositive of a constant absence residing in a locus of that thing." And [that pervasion is a connexion independent of an accident is confirmed by the fact that] an accident is necessarily involved in deviation. Counterpositiveness is not opposition in the sense of "impossibility [for two things] to reside together [in a third thing]", for cowness and horseness [,which cannot reside together in the same thing,] are not so treated [as if one were the counterpositive of the other] and the counterpositive of a mutual absence is not a side of such an opposition. But counterpositiveness is [here] a kind of peculiar relation such as there is between an absence and its locus ⟨and so is subjunctness⟩; or [one might define it as] "being what is lack of absence [of the thing]".'

79.1–4. [Objection.] If the attribute [i.e. the accident] is that which pervades no matter what probandum without pervading the [corresponding] probans, then the negation of the attribute will be untrue for smoke and other things [that are probans in a true inference like It has fire because it has smoke]; whereas if it is meant that the attribute pervades the probandum [of the inference] in question without pervading the probans [of that inference], then the attribute cannot be denied, whether it exists or not.

79.4–80.2. [The opponent:] '[We mean this:] (a) [The property of] being no pervader of the probans is denied of all things that pervade the probandum (such a thing is for instance "being object of knowledge"), and (b) [the property of] being pervader of the probandum is denied of all things that do not pervade the probans (such a thing is for instance potness).'

80.2. [Objection.] We do not agree, because it does not attach to the subject.

80.2–4. [The opponent:] 'Then it should run as follows: (1) [the probans'] being that whose [corresponding] probandum all non-pervader of the probans does not pervade, or (2) [the probans'] being that which all pervader of the probandum pervades.'

80.4–81.3. [Answer.] No, for this applies also to a probans with an accident. E.g. let fire be probans and smoke probandum. (1) Wet fuel, all of which does not pervade fire, is for each [instance] singly no pervader

of smoke. As for (2), the wet fuel which pervades smoke is a pervader of kitchen fire.

82.1–3. Nor can 'being independent of an accident' be defined as (13)' [the probans'] non-deviation from all things from which the probandum does not deviate', since the same is already conveyed by' [the probans'] non-deviation from the probandum.' This [kind of definition], however, has been condemned.

77.1–79.1. *Athâ...abhāva-virahâtmatvaṃ vêti.* G. now turns to a new type of definition, viz. that which describes pervasion as a connexion independent of an accident, i.e. as a concomitance which exists independently of an accident (*upādhi*, p. 14). M. calls it the Teacher's definition (*ācāryīya-lakṣaṇa*, 78.12); in his commentary on definition (1) (34.2; cf. Ingalls, p. 104) he quotes from the Teacher's work the definition of counter-positiveness, here found at the end of the passage. The logician who is usually referred to as the Teacher (*ācārya*) is Udayana; he was one of the last great teachers of Old Nyāya. Thus there is little doubt that the definition the opponent sets forth is Udayana's. Varieties of the same type of definition are given in chapter VII (definitions (26–28)), where G. deals with correct definitions of pervasion different from his conclusive definition.

77.2. *upādhiś...sādhanâvyāpakaḥ.* The opponent's definition of accident has the same formula as the conclusive definition of accident given by G. in his Theory of accident (Upādhivāda, 336.3), except that in G.'s formula the probandum, which the accident pervades, is confined to the locus either of some attribute of the probans or of the probans itself. The present definition of accident is applicable to the example G. uses (in 81.1) to show the ambiguity of the opponent's definition of pervasion. Accident (*upādhi*) is defined here as something that (1) pervades the probandum, but (2) does not pervade the probans. Thus it is stated explicitly (by (2)) that (a) the probans occurs *somewhere* without the accident, and implicitly (by (1)) that (b) where the probans occurs without the accident there the probandum is no concomitant of the probans; but (c) *elsewhere* the probans occurs with the accident, and (d) where the probans occurs with the accident there the probandum is a concomitant of the probans. The statements (c) and (d) are not implied by the definition, but are taken to be involved in the meaning of the word *upādhi* (this will be explained in

166.5). From the definition we can only deduce: (e) wherever the probandum is a concomitant of the probans there is the accident. Take the example 'It has smoke because it has fire with wet fuel' and let A be the probans (fire), B the probandum (smoke) and C the accident (wet fuel). Then we may represent the above statements as follows: (a) Somewhere there is A without C. (b) Wherever there is A without C there is A without B. (c) Somewhere there is A with C. (d) Wherever there is A with C there is A with B. (e) Wherever there is A with B there is C. (b) and (e) are logically implied by (1): Wherever there is B there is C. Cf. p. 15.

77.3. *vyāpakatvaṃ tu...âpratiyogitvam.* Since the opponent uses in his definition the term pervader (*vyāpaka*), which presupposes a knowledge of pervasion, he would be guilty of begging the question, if his definition of accident were not followed by an explanation of what pervader is. Thus he proceeds to define this. His definition is correct. 'Being a pervader of A' (*vyāpakatva*) is 'not being the counterpositive of a constant absence residing in a locus of A', i.e. being the opposite of what does not occur in some locus of A, i.e. being that which occurs in all loci of A.

It must be noted that the relation 'being a pervader of' is the converse of the relation 'pervasion'. For 'pervasion' is 'being pervaded by' (*vyāpyatva*), since the reason, the thing pervaded, is assumed to be the subject of pervasion (p. 6).

77.3–4. *vyabhicāre...upādhiḥ.* That pervasion does not depend upon an accident is confirmed by the fact that an accident is always involved in deviation, the opposite of pervasion.

77.4–78.3. *pratiyogitvam...tathā pratiyogitvam.* 'Counterpositiveness' (*pratiyogitva*) was included in the definition of 'being a pervader of'; this in turn was an element in the definition of accident used to define pervasion. That may be the reason why the opponent proceeds to state clearly what counterpositiveness means. For it might be taken to mean something that involves pervasion; then the charge of circulus would arise, since being a pervader and finally pervasion would be defined by means of pervasion. To avoid this the opponent points out that counterpositiveness is not concerned with an opposition such as we have between two attributes that cannot occur together in the same subject; such an opposition is in fact a situation in which one attribute is pervaded by the absence of the other (*tad-abhāva-vyāpyatva*, M. 80,11). To take the opponent's example, cowness is pervaded by absence of horseness, since a

cow cannot be a horse. 'Being a cow' and 'being a horse' are contraries; they cannot be true of the same subject, but can be untrue of the same subject, e.g. a dog. The counterpositive of an absence, however, standing in the relation denied by the absence, is contradictory to that absence, since in *any* locus a thing either is or is not. (Cf. however § 2, note on 71.4–72.4.) That a counterpositive is not simply a side of an opposition in which one side excludes the other from an underlying subject (as cowness excluded horseness from a cow) can be seen by looking at a mutual absence. There we have not a distinct substratum, in which the absence occurs and therefore its counterpositive cannot occur by the relation which the absence denies, but a subject (locus) which *is* the absence and therefore cannot *be* the counterpositive. So it is quite possible that a mutual absence and its counterpositive *occur* together in the same subject. An instance of this is given in a note of T.C. 81: substanceness and quality, either of which is a locus of mutual absence of the other (substanceness is not quality), occur in substance. Mutual absences are indeed denials of identity. Identity is a non occurrence-exacting (*vṛtty-aniyāmaka*) relation. An occurrence-exacting relation is irreflexive, while identity is reflexive. Cf. Ingalls, p. 73, and my introduction, p. 7.

78.2–3. *yathâdhikaraṇâbhāvayoḥ...pratiyogitvam.* For the peculiar relation (*svarūpa-saṃbandha*) existing between an absence and its locus, as well as for peculiar relation in general, see Ingalls, pp. 41, 58[n103], and my introduction, p. 5.

78.3–79.1. ⟨*anuyogitvam*⟩ *api*, 'and so is subjunctness'. The relation of subjunctness is the converse of the relation of counterpositiveness (*pratiyogitva*). In general *pratiyogin* is translated by 'adjunct', but in relation to an absence we call it 'counterpositive' (see p. 8).

The structure of the whole sentence will be more natural if we omit *anuyogitvam* and read as M. does (81.13) *tathā pratiyogitvam api.* I have therefore put *anuyogitvam* in brackets.

79.1. *abhāva-virahâtmatvam*, i.e. being the negation of the absence. M.'s paraphrase is as follows: *yasyâbhāvasyâbhāvo yo bhavati sa tasyâbhāvasya pratiyogī bhavati.* We can translate this 'A is the counterpositive of absence of B if, and only if, the negation of absence of A is B.'

79.1–4. *yatkiṃcit-...śakyaḥ.* The opponent has defined pervasion as a relation in which no accident is involved. To explain this he has offered a separate definition of accident. In his definitions he speaks of an accident,

a probandum the accident pervades and a probans the accident does not pervade. Now one might ask: What accident, probandum and probans are referred to? Either they are taken from any given inference or they belong to the inference in question, viz. an inference by pervasion like It has fire because it has smoke. G. first considers the first alternative. Then the definition of pervasion will not hold; for it is easy to find something that is accident in some inference, and therefore pervades the probandum without pervading the probans of that inference, and accompanies smoke which is probans of the inference by pervasion 'It has fire because it has smoke'. The example M. gives (84.15–16) belongs to the inference 'It has a quality because it is an object of knowledge and a substance', where 'having a quality' (*guṇavattva*) is probandum, 'being object of knowledge' (*prameyatva*) probans and 'substanceness' (*dravyatva*) accident. Whatever has a quality is a substance; there are objects of knowledge which are not substances; smoke is accompanied by substanceness, for its loci are substances. G. next considers the second alternative. Then we have the difficulty that we cannot find an attribute which pervades the probandum without pervading the probans. And what does not exist cannot be denied. And if such an attribute is supposed to exist, then an inference by pervasion cannot be the inference in question. For in an inference by pervasion every attribute that pervades the probandum pervades the probans, since the probandum pervades the probans. The relation of pervasion is transitive (p. 7), and so is its converse (see note on 77.3).

79.3. *siddhy-asiddhibhyām* is an instrumentalis modi (cf. M. 304.11). The expression is common in Navya-nyāya. Its meaning is: whether the existence of the thing is known or not. We have the following dilemma: (1) If the accident exists, then the relation of probans to probandum cannot be pervasion; and pervasion is the relation in question; thus there will be nothing of which the accident is deniable. (2) If the accident does not exist, then it cannot be denied. For if a denial is to be valid, the thing denied must be known to exist.

79.4–80.2. *yāvat-. . .niṣidhyata iti.* G. has argued that it is impossible to define pervasion as a relation with a probans of which an accident is denied. The opponent now intimates that what he has in view is not the negation of the accident, but the negation of the fact stated in the definition of accident. The definition states that there is an attribute which

pervades the probandum but does not pervade the probans. This statement is contradicted by the following two statements: (a) No attribute that pervades the probandum does not pervade the probans. – Here 'being no pervader of the probans' is denied of every attribute that pervades the probandum; such an attribute is for instance 'being object of knowledge' (everything is object of knowledge). (b) No attribute that does not pervade the probans pervades the probandum. – Here 'being pervader of the probandum' is denied of every attribute that does not pervade the probans; such an attribute is for instance 'potness' (some pots are not loci of smoke, which is probans in It has fire because it has smoke). (a) and (b) are universal negative, convertible into each other and therefore equivalent. Both statements are expressed by the formula the opponent here gives as his definition of pervasion.

80.2. *na.Vyadhikaraṇatvāt.* G. rejects the opponent's formula, on the ground that it does not define pervasion as a property of the probans. It is not the probans that figures in it as the subject of which something is asserted or denied, but some attribute which pervades the probandum or does not pervade the probans. So the formula does not define a relation which has for its subject the probans. *vyadhikaraṇatva* has here the original meaning 'being related to a different subject (locus)', i.e. 'not attaching to the subject in question'.

80.2–4. *yāvat-. . . tattvaṃ.* The new formula given by the opponent relates the statements (a) and (b) of the preceding formula as properties to the probans, so that the definition will no longer be open to G.'s objection that it does not attach to the subject. What was (b) in the last formula appears as (1) in the present one, and what was (a) appears as (2). For we have the following statements: (1) No attribute that does not pervade the probans pervades the probandum, and (2) Every attribute that pervades the probandum pervades the probans. (1) and (2) are equivalent, as (a) and (b) were. The definition, then, is logically correct; for among the attributes pervading the probandum there is the probandum itself, since it occurs in all loci of the probandum; then according to (2) the probandum pervades the probans. We have already noticed that the relation of pervasion is transitive (p. 93), so that if the probandum pervades the probans, every attribute that pervades the probandum must pervade the probans.

80.4–81.3. *Sopadher. . . mahānasīya-vahneḥ.* G. now points out the am-

biguity of the opponent's formula, in the same way as he has pointed out the ambiguity of other formulations used as definitions of pervasion. The ambiguity is due to not quantifying the attributes explicitly in formulating their relations. The effect of this is that the present definition becomes so wide as to be applicable to that probans which is accompanied by an accident and therefore not pervaded by the probandum. This G. illustrates by the example of fire (probans), smoke (probandum) and wet fuel (accident) (see note on 77.2). He applies that example to the first definitory statement in this way: Of the instances of wet fuel, of which the whole set does not pervade fire, (a) that which occurs in the kitchen does not pervade smoke (since it does not occur in some locus of smoke, e.g. mountain), (b) that which occurs on the mountain does not pervade smoke (since it does not occur in some locus of smoke, e.g. kitchen), etc.; thus any instance of wet fuel does not pervade smoke, since it does not occur in some locus of smoke. That is true. But a genuine non-pervasion of the probandum by the accident means that any instance of the accident does not occur in the *same* locus of the probandum, i.e. that *no* instance of the accident occurs in a certain locus of the probandum, since the contradictory of 'All loci of A are loci of B' is 'There is a locus of A which is not locus of B, i.e. which is one in which no B occurs.' The definitory statement, however, is ambiguous, since it may express a non-pervasion of the probandum by an instance of an attribute which does not pervade the probans; here 'all non-pervader of the probans' (*yāvat-sādhanâvyāpaka*) is taken to mean '*all instances* of a non-pervader of the probans', instead of 'all things that do not pervade the probans'. Thus G. interprets the statement as meaning that of the instances of an attribute, all of which do not pervade the probans, each single does not pervade the probandum. On this interpretation, as we have seen in the example, the definition is too wide, and must therefore be rejected. To the second definitory statement G. applies the same example in the following way: Wet fuel that pervades smoke pervades kitchen fire, since kitchen is one of its loci. The second definitory statement suffers from ambiguity since it may mean that an attribute whose set of instances pervades the probandum pervades an *instance* of the probans.

80.4. *Sopādher. sopādhi* ('which has an accident') is said of the probans. The probans is or is not accompanied by an accident (Cf. M. 162.5).

82.1–3. *Nâpi. . .gamakatva-saṃbhavāt.* The relation of *avyabhicāritva*

(non-deviation) is identical with that of *vyāpyatva* (= *vyāpti*, pervasion; cf. chapter I); its converse is the relation of *vyāpakatva* (being a pervader of, pervaderness; see note on 77.3). We have proved that if every attribute that pervades the probandum pervades the probans, the probandum must pervade the probans. We can equally well say that if the probans does not deviate from every attribute from which the probandum does not deviate, the probans does not deviate from the probandum. From this and from the transitivity of the relation it follows that the formula here given of *anaupādhikatva* (being independent of an accident) is logically equivalent to the shorter 'the probans' non-deviation from the probandum'. Since the shorter formula must be preferred, definition (13) is rejected by G..

82.3. *dūṣitam*, 'blamed', viz. in chapter I. G. reminds the opponent of the fact that also the shorter 'the probans' non-deviation from the probandum' has been rejected.

The two statements which constitute definition (12) may be represented in symbolic language (C stands for any given attribute) as follows:

(1) $$(Ex)\,[(y)\,(Cy\rightarrow\sim Tyx)\wedge(Ey)\,(Ay\wedge Ryx)]\rightarrow$$
$$\rightarrow(Ex)\,[(y)\,(Cy\rightarrow\sim Tyx)\wedge(Ey)\,(By\wedge Syx)]$$

(2) $$(x)\,[(Ey)\,(By\wedge Syx)\rightarrow(Ey)\,(Cy\wedge Tyx)]\rightarrow$$
$$\rightarrow(x)\,[(Ey)\,(Ay\wedge Ryx)\rightarrow(Ey)\,(Cy\wedge Tyx)].$$

(1) and (2) are equivalent.

(1) and (2) are implied by the formula of pervasion:

(3) $$(x)\,[(Ey)\,(Ay\wedge Ryx)\rightarrow(Ey)\,(By\wedge Syx)]$$

since

(4) $$\perp(x)\,(Lx\rightarrow Mx)\rightarrow[(x)\,(Mx\rightarrow Nx)\rightarrow(x)\,(Lx\rightarrow Nx)].$$

If there is a C such that

(5) $$(x)\,[(Ey)\,(Cy\wedge Tyx)\rightarrow(Ey)\,(By\wedge Syx)]\wedge$$
$$\wedge(x)\,[(Ey)\,(Ay\wedge Ryx)\rightarrow(Ey)\,(Cy\wedge Tyx)]$$

then (3) is true (i.e. we have pervasion), since

(6) $$\perp[(x)\,(Nx\rightarrow Mx)\wedge(x)\,(Lx\rightarrow Nx)]\rightarrow(x)\,(Lx\rightarrow Mx).$$

(7) $$\perp(5)\rightarrow[(1)\leftrightarrow(3)]$$

(8) $$\perp(5)\rightarrow[(2)\leftrightarrow(3)]$$

§ 6. *Definitions* (14–16)

83.1 *Nâpi kārtsnyena saṃbandho vyāptiḥ, eka-vyaktike tad-abhāvāt, nānā--vyaktike 'pi sakala-dhūma-saṃbandhasya pratyeka-vahnāv abhāvāt. Ata eva na kārtsnyena sādhyena saṃbandho vyāptiḥ, viṣama-vyāpte tad-abhāvāc ca.*

Na ca yāvat-sādhanâśrayâśrita-sādhya-saṃbandhaḥ, sādhanâśraye mahānasâdau sakale pratyeka-vahner āśritatvâbhāvāt.

83.1–4. Nor can pervasion be (14) a connexion comprising the totality [of the probans], since (a) when there is only one instance [of the probans], there is no totality. And even (b) when there are several instances [of the probans], [pervasion cannot be such a connexion], since a connexion comprising [for instance] all smoke does not occur in each single fire. For the same reason pervasion cannot be (15) a connexion which comprises the probandum in its totality; the further reason is that it would fail in the case where the pervaded term is unequal [to the pervader term].

83.4–6. Nor [can pervasion be] (16) a connexion which comprises the probandum in so far as it rests on the extent of locus of the probans, since all the loci (kitchen etc.) of the probans are no locus of each single fire.

83.1. *kārtnsyena saṃbandho*, 'a connexion by way of totality.' Connexion and totality have the same subject, viz. the probans. The meaning of definition (14) is: a relation connecting *all* instances of the probans with instances of the probandum by means of their loci. We say that the relation of pervasion must have for its domain the probans class. G. will return to this type of definition in 156.1.

83.1–2. *eka-vyaktike tad-abhāvāt.* A totality implies that there are *several* instances to form it. *eka-vyaktika* (having only one instance) is said of a unit-class such as an abstract property like substanceness (see p. 5).

83.2–3. *sakala-. . .-vahnāv abhāvāt.* If 'fire' (probandum) is used distributively (*pratyeka*), the definition fails, because any instance of fire does not have for its locus the loci of all instances of smoke (probans).

83.4. *viṣama-vyāpte tad-abhāvāc ca.* In the case of smoke (probans) and fire (probandum) there is a particular locus of fire, red-hot iron, which is no locus of smoke. And because there are more loci of fire than loci of smoke, there are more instances of fire than instances of smoke, since

we have one instance of fire corresponding to one locus of fire, and similarly one instance of smoke corresponding to one locus of smoke. Thus a relation of smoke to fire through their common loci, though comprising all instances of smoke, cannot comprise all instances of fire. *viṣama-vyāpta* designates the pervaded term whose *locus* is unequal in extent to *locus* of the pervader term. If locus of the one term is coextensive with locus of the other term, we call the pervaded term *sama-vyāpta*; then the terms pervade each other.

83.4–6. *Na ca... āśritatvâbhāvāt.* Definition (16) corrects definition (15) by excluding from the relation the instances of the probandum which do not correspond to loci of the probans. Yet definition (16) is rejected for the same reason for which definitions (14) and (15) have been rejected.

That the relation of pervasion comprises all instances of the probans, but not necessarily all instances of the probandum, is clearly shown by the prenex form of the formula of pervasion (p. 32):

(1) $(x)(y)(Ez)[(Ay \wedge Ryx) \rightarrow (Bz \wedge Szx)]$.

The variable 'y' denoting an instance of the probans is bound by a universal quantifier, and the variable 'z' denoting an instance of the probandum is bound by an existential quantifier.

§ 7. *Definition* (17)

84.1 *Nâpi sādhana-samānâdhikaraṇa-yāvad-dharma-samānâdhikaraṇa-sādhya-sāmānādhikaraṇyaṃ, yāvad-dharma-sāmānādhikaraṇyaṃ hi yāvat-tad-dharmâdhikaraṇâdhikaraṇatvaṃ tac câprasiddhaṃ sādhana-samānâdhikaraṇa-sakala-mahānasatvâdy-adhikaraṇâpratīteḥ.*

84.1–5. Nor [can pervasion be] (17) '[the probans'] having a common locus with the probandum which has a common locus with all the attributes that have a common locus with the probans'. For 'having a common locus with all the attributes' means 'having as locus a locus of all the attributes' – which is unexampled, since we cannot form a clear conception of something that is locus of all the things, kitchenness etc., that have a common locus with the probans.

84.1–5. Definition (17) closely resembles definition (11). The only difference is that instead of the more complicated *-yāvad-dharma-nirūpita--vaiyadhikaraṇyânadhikaraṇa* it uses *-yāvad-dharma-samānâdhikaraṇa* as a qualification of the probandum. In using the simpler form, however, it is vitiated by an ambiguity which the method of double negation adopted by definition (11) seems to avoid. For the simpler form is easily taken to mean 'having as a locus what is locus of the whole set of attributes'. Such a locus is difficult to conceive; in the case of the true inference 'It has fire because it has smoke' it would have to be something like the conjunction 'kitchen and mountain etc.', i.e. kitchen which is a mountain etc., since kitchenness, mountainness etc. are the attributes in question. The definition must then be rejected because of unexampled term (*aprasiddha*, p. 18). But if *yāvad-dharma* is used distributively, i.e. in the sense of 'each of the attributes', then the definition is admissible in the same way as definition (11) was. Cf. § 4 note on 75.3.

84.3. *yāvat-tad-dharmâdhikaraṇâdhikaraṇatvam*, 'having as locus a locus of all the attributes that (have a common locus with the probans)'. *-tad-* is correlative to *yāvat-*.

Definition (17) may be symbolically represented by

$$(1)\qquad (Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \wedge \wedge (z)\,\{(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge Tzx] \rightarrow \rightarrow (Ex)\,[Tzx \wedge (Ey)\,(By \wedge Syx)]\}.$$

(1) is equivalent to formula (1) of definition (11). See under § 4.

G.'s interpretation of definition (17), 'the probans' having a common locus with the probandum which has as a locus what is locus of all the attributes that have a common locus with the probans', may be represented as follows:

$$(2)\qquad (Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \wedge \wedge (w)\,\{(z)\,[(Ex)\,((Ey)\,(Ay \wedge Ryx) \wedge Tzx) \rightarrow Tzw] \rightarrow \rightarrow (Ey)\,(By \wedge Syw)\}.$$

The inconceivability (or non-existence) of a locus common to all attributes related by a one-one-relation (T) (see under § 4) is expressed by

$$(3)\qquad \sim (Ew)\,(z)\,\{(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge Tzx] \rightarrow Tzw\}.$$

§ 8. *Definition* (18)

85.1 *Nâpi svābhāvikaḥ saṃbandho vyāptiḥ, svabhāva-janyatve tad-āśritatvâdau vā avyāpty-ativyāpteḥ.*

85.1–2. Nor can pervasion be (18) a connexion which is essential [to the reason]. For 'essential' means 'originating from the essence' or 'resting on the essence' etc.; so that there would be non-pervasion and over-pervasion respectively.

85.1. *svābhāvikaḥ saṃbandho,* i.e. that connexion between the reason and the probandum through the common loci which is essential to the reason, in the sense that no accident is needed to establish it. *svābhāvika* (essential) is used here in opposition to *aupādhika* (accidental, M. 88.3). The connexion of reason and probandum is said to be accidental when it depends on the presence of an accident (*upādhi,* p. 14 and § 5, note on 77.2).

85.1–2. *svabhāva-janyatve...-ativyāpteḥ.* G. explains why *svābhāvika* (essential) cannot be used to define pervasion. *svābhāvika* means either (1) *svabhāva-janya* (originating from the essence) or (2) *svabhāvâśrita* (resting on the essence, i.e. having for its subject (locus) the essence, cf. 83.5). (1) In the first sense it cannot be used of a connexion between attributes related to their loci by the relation of inherence, since then, the relation of the attributes to their loci being eternal (=necessary, p. 4), the connexion of the attributes through their loci cannot originate from anywhere, but must be of the same eternal character as the relation of inherence (M. 88.6, note 1). An example of this is the connexion between earthness (reason) and substanceness (probandum), stated in the true inference 'It is a substance because it possesses earthness' (*dravyaṃ pṛthivītvāt*). The definition fails to cover the pervasion in this inference and therefore suffers from the fault of non-pervasion (*avyāpti,* p. 10). (2) In the second sense the word can be used also in the case of the false inference 'It is a substance because it has reality' (*dravyaṃ sattvāt*), since the connexion between reality (reason) and substanceness (probandum) through the common loci (substances) rests on the 'essence' of reality, i.e. comprises the whole of reality, reality being a unit class (p. 5). But since reality has more loci than substanceness, there is no pervasion of reality

by substanceness; the definition which now applies to a false inference suffers from the fault of overpervasion (*ativyāpti*, p. 10).

85.2. *tad-āśritatvâdau*. M. (88.11–13) brings under *-ādi* (etc.) *anāropitatva*, i.e. the fact that a predicate is not falsely assigned to a subject. In the false inference 'It is a substance because it has reality' a connexion with substanceness (probandum) through common loci (substances) is not falsely assigned to reality (reason). Thus the definition suffers from the fault of over-pervasion.

85.2. *avyāpty-ativyāpteḥ*. The use of the neuter singular of this dvandva (copulative compound) is quite regular (Pāṇini 2, 4, 13. 17).

§ 9. *Definition* (19)

85.3 *Nâpy avinābhāvaḥ, kevalânvayiny abhāvāt.*

85.3. Nor [can pervasion be] (19) inseparability [of the reason from the probandum], since it would then fail to apply in the case of universal-positives.

85.3. *avinābhāva* (inseparability) is a term especially used in Buddhist and Jaina logic to denote invariable concomitance. M. (88.14–15) paraphrases it by *sādhyâbhāvavad-vṛtti-bhinna*, 'what is different from occurrence in a locus of absence of the probandum', which is a variant of definition (1) (chapter I).

85.3. *kevalânvayiny abhāvāt*. See 31.1–2 (chapter I) and my note thereupon.

§ 10. *Definition* (20)

86.1 *Atha saṃbandha-mātraṃ vyāptiḥ, vyabhicāri-saṃbandhasyâpi kena cit saha vyāptitvāt, dhūmâdi-vyāptis tu viśiṣyâiva nirvaktavyêti,*

*87.1 *tan na, liṅga-parāmarśa-viṣaya-vyāpti-svarūpa-*nirūpaṇa-prastāve lakṣaṇâbhidhānasyârthântaratvāt. Na ca saṃbandha-mātraṃ tathā, tad-bodhād anumity-anutpatteḥ.*

88.1 *Nâpi vyāpti-pada-pravṛtti-nimittam idaṃ saṃbandha-jñāne 'pi vyāpti--padâprayogāt.*

86.1–3. [Opponent:] 'But pervasion is (20) simply a connexion [of reason and probandum], since even a connexion which involves deviation [of the reason from the probandum] is turned into a pervasion by the addition of something. The cases of pervasion like that of smoke [and fire], however, must be stated by way of specification'.

86.3–87.2. [Answer.] You are wrong. For our task is to describe the nature of pervasion in so far as it is object of the consideration of a sign; then expressing your definition would be shifting the topic. A mere connexion [through common loci] is not such [as to be object of the consideration of a sign], since no conclusion springs from its apprehension.

88.1–2. Nor can this [connexion] be that which gives rise to the application of the word pervasion. For even when we have the knowledge of such a connexion, we do not use the word pervasion [to express this knowledge].

86.2. *kena cit saha*, 'with something', by the addition of something. This phrase is most naturally interpreted by supposing the opponent to mean by 'something' an accident (*upādhi*, p. 14) which in connexion with the reason establishes a pervasion by the probandum. What is meant, then, must be this: A connexion between reason and probandum consists primarily in their possession of common loci; if, in addition, all loci of the reason are loci of the probandum, then the connexion is in itself a pervasion of the reason by the probandum; if, on the other hand, the reason shares only some of its loci with the probandum, i.e. if the reason deviates from the probandum through its having more loci, then a pervasion by the probandum can be reached when we restrict the extent of locus of the reason by adding the appropriate accident; this addition will transform the 'connexion' of reason and probandum into a pervasion of the conjoint reason and accident by the probandum, to be regarded as a pervasion of a qualified reason by a probandum. So we shall always have a pervasion of the reason by the probandum. The close connexion between accident and deviation was pointed out in 77.3 (§ 5).

M. (90.4), following Raghunātha (Dīdh. 301.12), has a different interpretation, with which we need not concern ourselves, since it is not in accordance with the basic text (*mūlasyârthâsaṃgateḥ*, Dīdh. 302.11).

86.2. *dhūmâdi-vyāpti*, i.e. the cases of genuine pervasion.

86.3–87.1. *liṅga-parāmarśa-...-arthântaratvāt*. In his definition of inference (2.2; section I, § 1) G. has treated the consideration of a sign

(*liṅga-parāmarśa*) as the proximate cause of an inference. Now the pervasion we grasp in that consideration is the connexion between reason and probandum which we are to define here. This cannot be a connexion which merely consists in having common loci, since a mere possession of common loci is not a cause of inference. Thus the opponent deals with something that is different from the thing to be defined.

87.1. *arthântara* (another thing) is used in a technical sense; it means 'ignoratio elenchi.' It is one of the fallacies which in N.S. (5.2.7) are included under the category of *nigraha-sthāna* (occasion for reproof, i.e. point of defeat in argument). It is defined there as a reasoning which has no connexion with the subject-matter in hand (*prakṛtād arthād aprati-saṃbaddhârtham*).

87.2. *tad-bodhād anumity-anutpatteḥ.* If we apprehend the possession of two attributes by a certain locus (i.e. the occurrence of two attributes in a certain locus), we cannot infer from this and the possession of one of these attributes by the subject (*pakṣa*, p. 11) that the subject possesses the other attribute, while if we apprehend the pervasion of one attribute by another attribute, at the moment we come to know that the subject has the first attribute we infer that it has the second.

88.1. *pravṛtti-nimitta*, 'the cause of application (of a word)' (Renou, p. 228). We find the term used by grammarians when they describe the function of the abstract suffixes *tā* and *tva*. These suffixes form abstract nouns; they indicate the state of being the thing signified by the word to which they are affixed. This 'state of being' (*bhāva*) is considered to be the cause of our applying that word to the thing we have in view. Thus cowness (*gotva*, *gotā*) is the cause of our applying the word 'cow' (*go*) to an animal of a certain kind (cf. Kāśikā V, 1,119).

§ 11. *Definition* (21)

89.1 *Kevalânvayini kevalânvayi-dharma-saṃbandho vyatirekiṇi sādhyavad-anyâvṛttitvaṃ vyāptiḥ, etayor anumiti-viśeṣa-janakatvaṃ, anumiti-mātre pakṣa-*
*90.1 *-dharmatâiva prayojikā. *Na câtiprasaṅgaḥ, viśeṣa-sāmagrī-sahitāyā eva sāmānya-sāmagryāḥ kārya-janakatva-niyamād iti ke cit,*

tad api na, sādhyavad-anyâvṛttitvasya dhūme 'sattvāt, vahnimat- parva-
*91.1 *tânya*smin dhūma-sattvāt. Na ca sakala-sādhyavad-anyâvṛttitvaṃ vahni-matāṃ pratyekaṃ tathātvāt.*

89.1–90.2. Some people say: '(21) In the case of universal-positives pervasion is the connexion [of the reason] with the universal-positive attribute [which is probandum], while in the case of negatives it is non-occurrence in what is other than locus of the probandum. Either of these [types of pervasion] produces a determinate kind of conclusion; what effects conclusion simply is [the reason's] being an attribute of the subject. This [theory] will not apply too widely [to an inference without pervasion], for it is based on the principle that the whole set of necessary conditions for the generic nature produces its effect only when it is accompanied by the whole set of necessary conditions for the specific nature.'

90.2–91.2. [Answer.] That [definition] too is not correct; for there is no non-occurrence of smoke in what is other than a locus of the probandum, since there is smoke in what is other than the mountain, which is a locus of fire. Nor [can pervasion be defined as] non-occurrence in what is other than every locus of the probandum, since the same [,viz. that there is no non-occurrence of smoke in what is other than a locus of the probandum,] is true for each locus of fire taken singly.

89.1–2. *Kevalânvayini... vyāptiḥ.* This is an attempt made by some people to restrict the use of the preceding definition to the case of universal-positives and to adopt for the other cases the identification of pervasion with non-deviation, which G. has rejected only because of its inapplicability to universal-positives (31.1–2). Non-deviation has been defined in five ways (definitions (1–5), chapter I), of which the fifth is chosen here, probably because this definition expresses the nature of pervasion most clearly and succinctly. According to those people, then, a definition of pervasion as non-deviation may be regarded as correct except for the case of universal-positives; but in this case, they say, we can, using definition (20), define pervasion, without any risk of ambiguity, simply as a connexion of the reason with the universal-positive probandum, since such a connexion has evidently within its scope all loci of the reason, the probandum being an attribute that belongs to everything. Thus the pervasion of all cases of inference will be covered either by definition (5) or by definition (20).

89.1–2. *vyatirekiṇi*, i.e. in the case of inferences where the probandum is not universal-positive. These inferences admit of a negative 'example' (*udāharaṇa*, cf. p. 58). For the inference 'It has fire because it has smoke'

this 'example' is 'Where there is no fire there is no smoke, as in a lake.'

89.2. *sādhyavad-anyâvṛttitvaṃ.* This is definition (5).

89.2–3. *etayor...prayojikā.* To maintain that there are two alternative definitions of pervasion involves the consequence that there are two distinct types of pervasion, one occurring in universal-positives and the other in all remaining inferences. In his definition of inference (section I, § 1) G. has pointed out that pervasion is the cause of a conclusion (*anumiti*). This implies that a conclusion must be differentiated in the same way as pervasion. Thus, there being two different types of pervasion, there should be two different kinds of conclusion, the first kind containing a universal-positive probandum, the second a probandum which is not universal-positive. Yet these two types of conclusion must partake of a common nature, the generic nature of being conclusion of an inference; otherwise they would not be conclusions. Their generic nature presupposes the existence of a general cause. In fact every conclusion is caused by an inference in so far as its production depends on two conditions: (1) pervasion of the reason by the probandum and (2) the reason's being an attribute of the subject (*pakṣa-dharmatā*, see p. 11). Now, according to the advocates of definition (21), only the second condition is conceived indifferently in universal-positives and the other inferences. Thus only condition (2) can function as the general cause of both kinds of conclusion, i.e. as the cause of the generic nature common to all conclusions.

90.1. *Na câtiprasaṅgaḥ.* The objection to be refuted by the opponent is this: If the reason's being an attribute of the subject (*pakṣa-dharmatā*) is the necessary condition on which a conclusion really depends, then a conclusion will be reached by merely stating that the reason belongs to the subject. This is absurd. So your theory leads to impossibilities and must be rejected.

90.1. *viśeṣa-sāmagrī*, 'the whole set of necessary conditions for the specific nature', in the present case either of two types of pervasion which produce a specific nature of conclusion without which the generic nature of conclusion cannot exist. The generic nature is the potentiality of which the specific natures are the actualizations.

90.1–2. *sāmānya-sāmagrī*, 'the whole set of necessary conditions for the generic nature', in the present case the reason's being an attribute of the subject, which is the property that produces the generic nature of conclusion.

90.3–91.1. *tad api na...dhūma-sattvāt.* G. does not argue against the opponent's distinction between two kinds of pervasion, but only criticizes the formulation of the second kind. He points out the ambiguity of definition (5), which he had not pointed out before when dealing with the first five definitions of pervasion (ch. I). These definitions were ruled out by him on the ground that they fail to apply in the case of universal-positives; this ground cannot be adduced here, since the universal-positives are now excluded from the cases to which definition (5) has to be applied. G. points out that definition (5) is ambiguous because it might be interpreted to mean 'non-occurrence in what is other than *some* locus of the probandum'. Now the opposite of this, 'occurrence in what is other than some locus of the probandum', is true for true inferences such as 'It has fire because it has smoke', since there is smoke in the kitchen, which is different from the mountain, a locus of fire. It follows that definition (5) must be rejected even if we exclude from it universal-positives.

91.1–2. *Na ca...tathātvāt.* The reason (smoke) occurs in something (kitchen) different from the first locus (mountain) of the probandum (fire); the reason (smoke) occurs in something (mountain) different from the second locus (kitchen) of the probandum (fire); and so on. Then the occurrence of the reason in something different from a locus of the probandum is true, whatever locus of the probandum we select, i.e. it is true for *every* locus of the probandum. Now this situation may be expressed by *sakala-sādhyavad-anya-vṛttitva*, which is the opposite of *sakala-sādhyavad-anyâvṛttitva* (non-occurrence in what is other than every locus of the probandum), a new formulation of definition (5) with an explicit use of a quantifier, which in G.'s view is as ambiguous as the original formula, since it may mean that it is not true of every locus of the probandum that the reason occurs in something different from it. Thus the opposite of the definition will still apply in the case of a true inference such as 'It has fire because it has smoke.' Definition (5) is therefore not improved if we prefix *sakala* (all, every) to it. For the correct interpretation of definition (5) see chapter I, last note.

We have seen in chapter I that definition (5), if correctly interpreted as meaning 'the reason's non-occurrence in what is other than locus of the probandum', may be represented symbolically by

(1) $(y)\,\{Ay \rightarrow \sim(Ex)\,[(w)\,((Ez)\,(Bz \wedge Szw) \rightarrow (x \neq w)) \wedge Ryx]\}.$

(1) is equivalent to

(2) $\sim(Ex)\,\{(w)\,[(Ey)\,(By \wedge Syw) \rightarrow (x \neq w)] \wedge (Ey)\,(Ay \wedge Ryx)\}.$

The interpretation of definition (5) given by G. corresponds to

(3) $\sim(Ex)\,\{(Ew)\,[(Ey)\,(By \wedge Syw) \wedge (x \neq w)] \wedge (Ey)\,(Ay \wedge Ryx)\}.$

If *sakala* (all, every) is prefixed, definition (5) according to G.'s interpretation will be expressed by

(4) $\sim(w)\,\{(Ey)\,(By \wedge Syw) \rightarrow (Ex)\,[(x \neq w) \wedge (Ey)\,(Ay \wedge Ryx)]\}.$

§ 12. *There is a* circulus *in all the definitions*

91.2 *Sarvatra lakṣaṇe sādhyatva-sādhanatva-tad-abhimatatvānāṃ vyāpti-nirū-*
*92.1 *pyatvenâtmâśrayaḥ, *sādhyatvaṃ hi na siddhi-karmatvaṃ siṣādhayiṣā-*
-viṣayatvaṃ vā mahānasīya-vahnau tad-abhāvāt.

91.2–92.2. In all the definitions [of pervasion hitherto considered] there is a circulus. This is due to the fact that the notions of probandum and probans or what is regarded as one of these notions are determined by means of pervasion. For 'to be probandum' cannot mean 'to be object of the result of proving' or 'to be what the desire to prove is concerned with', since kitchen fire [,which in the true inference 'The mountain has fire because it has smoke' is included in the probandum,] cannot be such an object.

91.2–3. *Sarvatra...ātmâśrayaḥ.* What G. has pointed out in dealing with definition (10) (§ 3), he now points out with reference to all definitions of pervasion hitherto discussed, viz. that the charge of circulus arises from using in the definitory formula the terms 'probandum' (*sādhya*) and 'probans' (*sādhana*), whether the former term is explicitly used, the latter implicitly referred to, or both terms are explicitly mentioned. These terms are correlatives; there is between them, as we have explained under definition (10) (note on 74.3), a necessary connexion, and this connexion is nothing but the relation of pervasion; consequentially they are definable only by reference to pervasion. M. (96.5–7) offers the following pair of definitions: To be probandum (*sādhyatva*) in respect of a certain con-

clusion (*tad-anumitau*) is to be adjunct (*pratiyogitva*) of the pervasion (*vyāpti*) which limits (*avacchedaka*) the being object (*viṣayatā*) of the consideration (*parāmarśa*, see section I § 1, note 2.2) producing (*janakī-bhūta*) that conclusion (*tad-anumiti*); to be probans (*sādhanatva*) in respect of that conclusion (*tad-anumitau*) is to be substratum (*āśrayatva*) of such a pervasion (*tadṛśa-vyāpti*). We may reduce these definitions to a simpler form as follows: Probandum of a conclusion is the adjunct of the pervasion which is object of the consideration producing that conclusion; probans of a conclusion is the substratum of such a pervasion. Since pervasion is then included in the definition of probandum and probans, we cannot, if we want to avoid a circle, use these terms as elements in a definition of pervasion. All definition using these terms must therefore be rejected. – For the names given to the terms of a relation, cf. Ingalls, pp. 43 and 44, and my introduction p. 3.

91.3. *ātmâśraya*, 'foundation upon the thing itself', i.e. foundation upon the thing to be defined, i.e. circulus in definiendo.

92.1–2. *sādhyatvaṃ hi...tad-abhāvāt*. People wanting to escape the charge of circulus have tried to define 'probandum' and 'probans' without reference to pervasion. 'Probandum' (*sādhya*) should then mean (a) 'object of the result of proving' (*siddhi-karma*) or (b) 'what the desire to prove is concerned with' (*siṣādhayiṣā-viṣaya*, which can also be translated 'object of the desire to prove'). Both (a) and (b) designate the thing that in the conclusion is stated to attach to the subject (*pakṣa*). But neither in sense (a) nor in sense (b) can 'probandum' be used in the definitions of pervasion. For (1) as attribute of the subject in a conclusion it stands for a particular instance of the class it denotes (e.g. in 'The mountain has fire', which is the conclusion of the true inference 'The mountain has fire because it has smoke', 'fire' stands for mountain fire, and mountain fire, not kitchen fire, is the thing signified by (a) or (b)), while (2) as term of a pervasion it stands vaguely for some member of the class it denotes (e.g. in 'Wherever there is smoke there is fire' 'fire' stands for what is either mountain fire or kitchen fire or some other fire). In the terminology of scholastic logic we should say that in (1) its supposition is determinate (suppositio determinata), while in (2) its supposition is pure confused (suppositio confusa tantum or suppositio disjuncta). From this it is clear that 'probandum', if it were used in sense (a) or (b), could not be a term of pervasion nor be an element in a definition of pervasion.

§ 13. *Examination of pervasion must precede discussion*

92.2 *Na ca sāmānyato-vyāpty-avagamo 'sty eva, parasya katham anyathā*
*93.1 *dūṣaṇenâsādha*katāṃ sādhayed iti vācyaṃ, svârthânumānôpayogi-vyāpti-*
-svarūpa-nirūpaṇaṃ vinā kathāyām apraveśād iti.

92.2–93.2. The objection 'We do possess knowledge of pervasion in general; otherwise how are we to prove to another person the inconclusiveness [of a reasoning] because there is a fault [in it]? [So we need not define pervasion.]' should not be made. For we cannot enter into a discussion without having considered the nature of pervasion appropriate to inferring for oneself.

92.3. *dūṣaṇena. dūṣaṇa* here means 'fault', a fault like non-pervasion etc. (M. 99.1). *dūṣaṇa* in the sense of refutation is unusual in Nyāya logic.

93.1. *svârthânumāna*, 'inferring for oneself'. This refers to the inferential process, as stated in 2.1–3 (section I, § 1), whose final expression is in the form of a true inference such as The mountain has fire because it has smoke. Pervasion is an essential element in this process. So we must examine the nature of pervasion, if we are to use syllogism, the form of inference by which we prove a point in our discussion with a pupil or an opponent (*parârthânumāna*, 'inferring for the sake of others').

CHAPTER V

THE CONCLUSIVE DEFINITION OF PERVASION

100.2 *Atrôcyate. Pratiyogy-asamānâdhikaraṇa-yat-samānâdhikaraṇâtyantâ-*
bhāva-pratiyogitâvacchedakâvacchinnaṃ yan na bhavati tena samaṃ tasya
sāmānādhikaraṇyaṃ vyāptiḥ.

100.2–4. We state here [the following conclusion]: Pervasion is (22) the fact that that which constant absence shares a locus with, without sharing the locus with its counterpositive, shares a locus with that which is not what is determined by a limitor of the counterpositiveness to that absence.

100.2. *Atrôcyate*, 'It is stated here', introduces the true logical conclusion (*siddhānta*) following on the refutation of the objections raised in the preceding chapter (*pūrva-pakṣa*). This conclusion is G.'s definition of pervasion. G.'s definition is therefore called the *siddhānta-lakṣaṇa* (conclusive definition).

100.2–4. *Pratiyogy-... vyāptiḥ*. G.'s definition of pervasion can be best explained if we adopt a formulation more familiar to us, which runs as follows: There is pervasion of A by B if, and only if, A shares a locus with B in such a way that B is not a thing whose determining character is a limitor of the counterpositiveness to a constant absence which shares some locus with A without sharing it with its counterpositive. In this formulation A and B, being the terms of pervasion, denote respectively the relative *yat-* in *yat-samānâdhikaraṇa*, with its correlative *tasya*, and the relative *yan* in *yan na bhavati*, with its correlative *tena*. We analyse the definition as follows.

(1) *pratiyogy-asamānâdhikaraṇa*, 'not sharing the locus with its counterpositive'. This is a qualification of *atyantâbhāva* (constant absence, mentioned below in (2)). We have to take it in apposition to *yat-samānâdhikaraṇa* (which it (constant absence) shares a locus with); for the locus referred to must be the locus which the constant absence shares with A. Otherwise, if the meaning of (1) were 'sharing no locus with the counterpositive', we should have difficulty in applying the definition to a true inference with a probandum of incomplete occurrence, unless we assumed that G. now accepts the theory which he rejected before, viz. that absences differ as their loci differ (ch. IV, § 2, note on 71.4–72.4). The case of a probandum of incomplete occurrence has been examined in chapter IV, § 2. It is because of this case that G. has introduced (1) as a qualification of constant absence. He gives his explanation in chapter VII, § 2. We express this qualification by saying that the absent thing (the counterpositive) is *completely* absent from the locus.

(2) *yat-samānâdhikaraṇâtyantâbhāva*, 'which constant absence shares a locus with', i.e. a constant absence shares some locus with A. The counterpositiveness to this absence is mentioned in (3).

(3) *pratiyogitâvacchedakâvacchinnaṃ*, 'what is determined by a limitor of the counterpositiveness', i.e. a thing whose determining character is a limitor of the counterpositiveness. This is G.'s way of designating what might be called the universal present in the individuals, and as such the

counterpositive of a constant absence. Let the character be for instance waterness. What is determined (*avacchinna*) by waterness, forma sinc subjecto represented by the abstract concept 'waterness', is water, forma cum subjecto represented by the concrete concept 'water'. This water when appearing as the counterpositive of an absence must be taken in its full extent, i.e. as the class of waters; for a universal A is absent only if all individual A's are absent (p. 13). Thus (3) means 'what qua class (i.e. in its whole extent) is the counterpositive'; so that (1) + (2) + (3) comes to mean 'what qua class is the counterpositive of a constant absence which shares some locus with A without sharing it with its counterpositive', i.e. 'what qua class is completely absent from some locus of A'.

(4) *yan na bhavati*, 'which is not...', i.e. B is not...; (1) + (2) + (3) + (4) then gives the sense 'B is none of the things that qua class, i.e. in their whole extent, are completely absent from some locus of A.' The class of things that in their whole extent are completely absent from some locus of A is the complement of the class of things that are present in every locus of A. This follows from the fact that for a thing to be present in every locus of A it is enough that an instance (individual) of it is present in every locus of A (the instance may be different for a different locus); the presence of *some* instance of the thing in *every* locus of A is contradicted by the absence of *all* of its instances (i.e. by the absence of the thing in its whole extent) in *some* locus of A. Thus to say (1) + (2) + (3) + (4) is to say 'B is one of the things that are present in every locus of A'. The definition, then, implicitly states that B occurs in every locus of A.

(5) *tena samaṃ tasya sāmānādhikaraṇyaṃ*, 'the fact that that (which...) shares a locus with that (which...)', i.e. A shares a locus with B. *tasya* is a possessive genitive in the sense of 'belonging to that'; this indicates that A is the subject of the relation of *sāmānādhikaraṇya* (having a common locus, p. 6) and therefore also the subject of the relation of pervasion, since pervasion is defined as a special kind of that relation. B is the term of the relation (term in the strict sense, as opposed to subject).

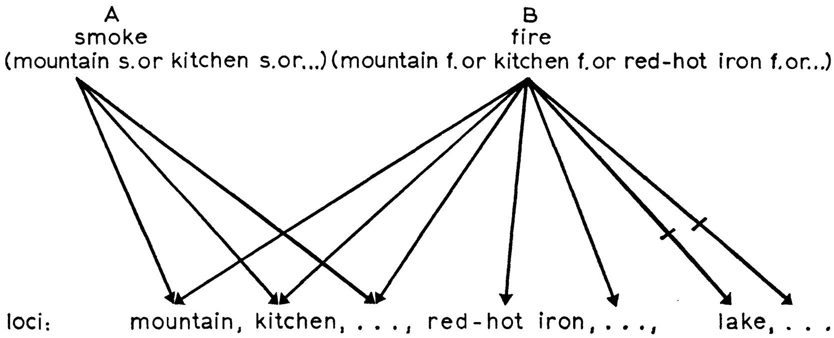
(6) *vyāptiḥ* 'pervasion is...', i.e. there is pervasion of A by B if, and only if, ...

On the interpretation given in our analysis, definition (22) can be formulated as follows: There is pervasion of A by B if, and only if, A has a common locus with B in such a way that B is none of the things that qua class are completely absent from some locus of A. We have shown that

this is equivalent to saying that there is pervasion of A by B if, and only if, A has a common locus with B in such a way that B occurs in every locus of A. Thus definition (22) agrees with our conception of pervasion (p. 6) and can therefore be regarded as logically correct.

We shall now exhibit the application of the definition to the various examples of inference known as typical of Navya-nyāya. For illustrative purposes we shall use diagrams. In these diagrams occurrence and its negation, (complete) constant absence, will be represented respectively by →, pointing to the locus in which an attribute A or B occurs, and by ↛, pointing to the locus from which an attribute B is absent. We can state the following rule: There is pervasion of A by B if, and only if, the arrows representing occurrence of A and those representing constant absence of B do not meet. This rule is nothing but an illustration of the definition as described in our analysis. It clearly shows the formal character of the definition. We first take two examples of inference in which the terms are classes containing several members or individuals (*nānā-vyakti*, p. 5).

(a) Example of a true inference: It has fire because it has smoke (*vahnimān dhūmāt*).

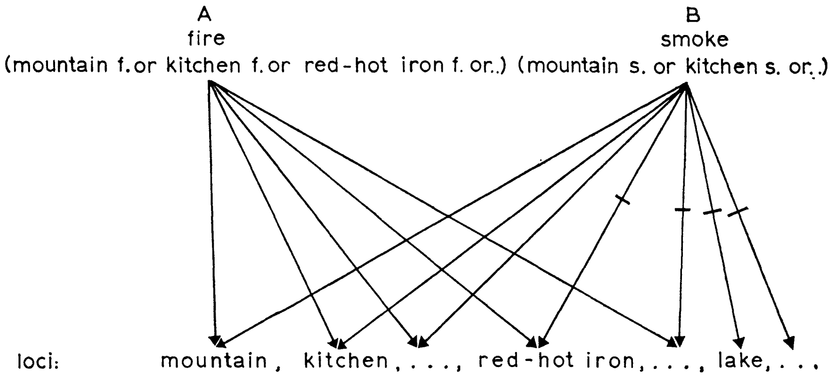


Fire (mountain fire or kitchen fire or red-hot iron fire or any other instance of fire) occurs in every locus of smoke; on the mountain there is mountain fire, and this implies that there is mountain fire or kitchen fire or red-hot iron fire or any other instance of fire; in the kitchen there is kitchen fire, and this implies the same, etc.. Thus there is not *constant absence of fire (constant absence of mountain fire and constant absence of kitchen fire and constant absence of red-hot iron fire and constant absence*

of any other instance of fire) in some locus of smoke, i.e. fire is none of the things that qua class are absent from some locus of smoke. Accordingly there must be pervasion of smoke by fire.

It is true that kitchen fire is absent from the mountain, but this absence of a fire in a locus of smoke does not matter, since kitchen fire is not the class of fires, but a member of this class.

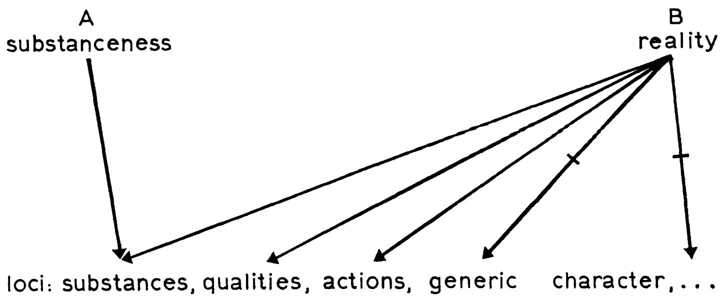
(b) Example of a false inference: It has smoke because it has fire (*dhūmavān vahneḥ*).



There is *constant absence of smoke (constant absence of mountain smoke and constant absence of kitchen smoke and constant absence of any other instance of smoke)* in red-hot iron, a locus of fire. Thus smoke is one of the things that qua class are absent from some locus of fire. There is no pervasion of fire by smoke.

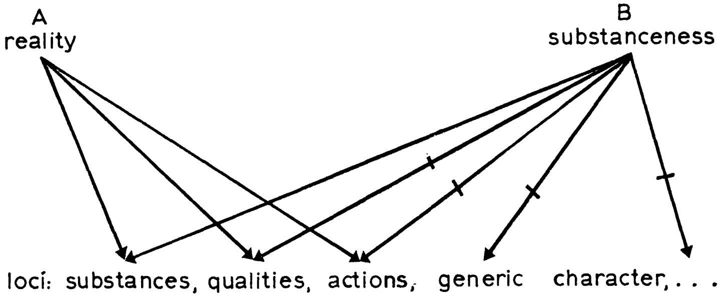
We next take two examples of inference which have as terms unit classes (*eka-vyakti*, p. 5).

(c) Example of a true inference: It has reality because it is a substance (*sattāvān dravyatvāt*).



Reality occurs in every locus of substanceness. Thus there is not constant absence of reality in some locus of substanceness, i.e. reality is none of the things that qua class are absent from some locus of substanceness. Accordingly there must be pervasion of substanceness by reality.

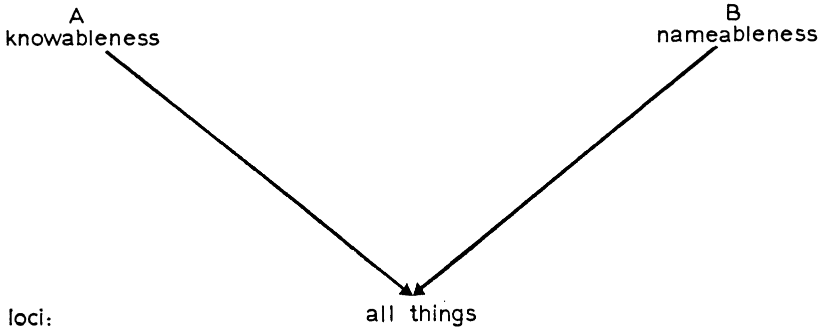
(d) Example of a false inference: It is a substance because it has reality (*dravyaṃ sattvāt*).



There is constant absence of substanceness in qualities and actions, which are loci of reality. Thus substanceness is one of the things that qua class are absent from some locus of reality. There is no pervasion of reality by substanceness.

The following example is an inference in which the terms are universal-positive (p. 5).

(e) Example of a true inference: It is nameable because it is knowable (*idaṃ vācyaṃ jñeyatvāt*).



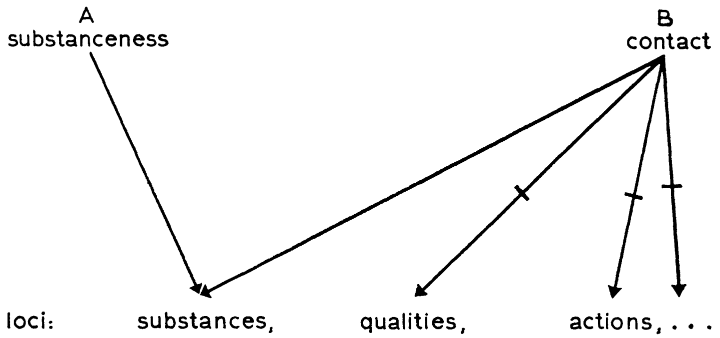
Nameableness occurs in every locus of knowableness. Thus there is not constant absence of nameableness in some locus of knowableness, i.e.

nameableness is none of the things that qua class are absent from some locus of knowableness. Accordingly there must be pervasion of knowableness by nameableness.

There is no unexampled term (*aprasiddha*, cf. ch. I, note on 31.1–2) involved, for here the formula refers to things in general that qua class are absent from some locus of nameableness, not to universal-positives that are absent (which is impossible).

Finally we take two examples of inference in which the probandum is of incomplete occurrence (*avyāpya-vṛtti*, p. 9).

(f) Example of a true inference: It has contact because it is a substance (*saṃyogī dravyatvāt*).

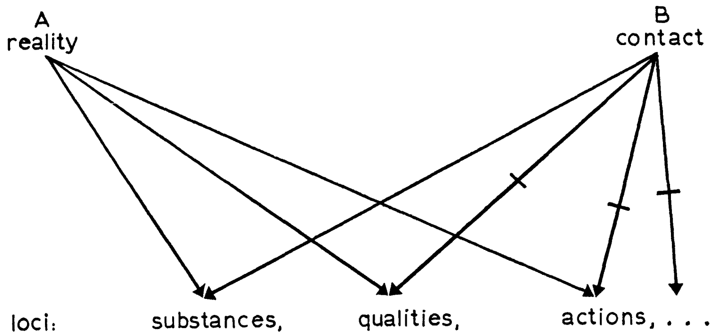


Contact occurs in every locus of substanceness. Thus there is not complete constant absence of contact in some locus of substanceness, i.e. contact is none of the things that qua class are completely absent from some locus of substanceness. Accordingly there must be pervasion of substanceness by contact.

It is true that there is absence of contact in substances, but this absence of contact in some locus of substanceness does not matter, since it is an incomplete constant absence.

(g) Example of a false inference: It has contact because it has reality (*saṃyogī sattvāt*). (Diagram p. 116)

There is complete constant absence of contact in qualities and actions, which are loci of reality. Thus contact is one of the things that qua class are completely absent from some locus of reality. There is no pervasion of reality by contact.



Definition (22) may be represented symbolically by

(1) $(Ex)[(Ey)(Ay \wedge Ryx) \wedge (Ey)(By \wedge Syx)] \wedge$
$\wedge \sim(Ex)[(Ey)(Ay \wedge Ryx) \wedge (y)(By \rightarrow \sim Syx)]$.

(1) is equivalent to the formula of pervasion (p. 32):

(2) $(x)[(Ey)(Ay \wedge Ryx) \rightarrow (Ey)(By \wedge Syx)] \wedge$
$\wedge (Ex)(Ey)(Ay \wedge Ryx)$.

The formulation of pervasion given by G. implies that pervasion is conceived as a relation between two classes in the sense that one class pervades the other (e.g. 'fire pervades smoke' means that the class of fires pervades the class of smokes), in the same way as inclusion, or implication, is thought of as a relation between two classes in the sense that the one includes, or implies, the other. Just as implication, Imp (A, B) (cf. Hilbert-Ackermann, p. 115), is defined by $(x)(Ax \rightarrow Bx)$, so pervasion, Per (A, B), is defined by either of the preceding formulae (1) and (2), provided that R and S are bound by existential quantifiers to be placed at the beginning of the formulae. Cf. p. 33.

CHAPTER VI

UNIVERSAL ABSENCE

124.2 *Anya-niṣṭha-vahner dhūmavat-parvata-vṛtty-atyantâbhāva-pratiyogitve'pi tat-pratiyogitā na vahnitvenâvacchidyate dhūmavati vahnir nâstîty apra-*

tīteḥ, sāmānyâvacchinna-pratiyogitākâbhāvaḥ pṛthag eva, anyathā sakala--prasiddha-rūpâbhāve prasiddha-rūpavad-anyatve câvagate vāyau rūpaṃ na vā vāyū rūpavān na vêti saṃśayo na syāt viśeṣâbhāva-kūṭasya niścitatvāt.

124.2–7. Though the fire that resides in another locus is the counterpositive of a constant absence that occurs in the mountain, a locus of smoke, yet the counterpositiveness to that absence is not limited by fireness, since we have no distinct knowledge that there is no fire in a locus of smoke. There must be apart [from particular absences] an absence the counterpositiveness to which is limited by a universal [character]; otherwise (1) having knowledge of the absence [in air] of all the colours known to us we should not doubt whether there is a colour in air or not, and (2) having knowledge of the differing [of air] from locus of the colours known to us we should not doubt whether air is a locus of colour or not, since [both in case (1) and in case (2)] the product of the particular absences would have decided [that air has no colour].

124.2–4. *Anya-niṣṭha-vahner...apratīteḥ.* Kitchen fire is the counterpositive of a constant absence occurring in the mountain, for kitchen fire is absent from the mountain. The counterpositiveness to that absence is limited by kitchen-fireness, not by fireness. Similarly the counterpositiveness to an absence occurring in the kitchen, another locus of smoke, is limited by mountain-fireness, not by fireness. Thus there is in none of the loci of smoke an absence the counterpositiveness to which is limited by fireness; otherwise, if the counterpositiveness were limited by fireness, fire would not occur in a locus of smoke – which would be contrary to our experiences. Definition (22) therefore applies in the case of the true inference It has fire because it has smoke. Cf. ch. V, note on 100.2–4.

124.3–4. *dhūmavati...apratīteḥ.* The T.C. (in accordance with M.'s commentary) connects this clause with what follows, but I prefer to connect it with what precedes by putting, as the Dīdhiti does, the comma after *apratīteḥ*. Not only does this give a more idiomatic text, but it gives a better sense since what follows is justified by a different example.

124.4–7. *sāmānyâvacchinna-...niścitatvāt.* G. has pointed out (124.2–4) that any absence occurring in a locus of smoke cannot have for the limitor of the counterpositiveness the class character 'fireness', i.e. it cannot have for its counterpositive fire q u a class. This means that it cannot

be a universal absence (*sāmānyâbhāva*) of fire. He now turns to the question whether a universal absence, the counterpositiveness to which is limited by the class character (*sāmānya*, for its meaning see p. 14), can be produced by a conjunction of the particular absences (*viśeṣâbhāva*), each of which has for its counterpositive a member of the class. For example, do we state the universal absence of fire by stating the absence of mountain fire *and* the absence of kitchen fire etc., which are the absences of individual fires *known to us*? If the statement of a universal absence is so achieved, knowledge of the particular absences will be sufficient to reach knowledge of the universal absence (cf. 75.1). G. answers here the question in the negative. He says that a universal absence is something existing apart from the particular absences which fall under it. What he means, then, must be that a universal absence does not consist in the (logical) product (*kūṭa*) of particular absences, but has a nature independent of them. His argument is this: If knowledge of the particular absences necessarily led to knowledge of the universal absence, – since a universal absence would then be limited to the logical product of the particular absences *known to us* (*prasiddha*) (thus to say 'There is no colour' would be equivalent to saying 'There is no red and there is no blue nor is there any of the other colours known to us') – we should no longer have our doubts about the occurrence of the universal absence as soon as we know with certainty the occurrence of the particular absences. Yet we sometimes doubt the occurrence of a universal absence, even when we are sure that all the particular absences known to us occur. So we doubt whether air (*vāyu*) has no colour, even after we have ascertained that none of the colours known to us occurs in it. The existence of this doubt indicates that knowledge of the collection of particular absences, which are absences of particular colours, is insufficient to reach knowledge of a universal absence of colour, knowledge by which the universal 'colour' is known to be absent from the air. G. gives no reason why this doubt exists; but we conform to his epistemology when we explain it by the fact that a universal absence is established, not by a conjunction of particular absences, but by an intuitive induction from particular facts by which it is seen to be implied. This intuitive process does not require the examination of all the particular absences falling under the universal absence. Such an examination is in fact impossible when we cannot observe all the particular facts forming these particular absences or when we never are

sure that we have observed them all, as in the case of absence of colour in the air, where a colour unknown to us may occur; then we shall always have our doubts about the universal absence, so long as we have not grasped it by means of an induction from perceived facts.

Colour (*rūpa*) is one of the twenty-four qualities that are assigned to all or some of the nine substances. Air (*vāyu*) is one of these substances. According to the orthodox view air has, besides the five general qualities (number, dimension, individuality, contact and separation), remoteness and nearness, velocity and tangibility, but no colour. Cf. section I, § 2, note on 21.1–2.

124.6–7. *vāyau...na vêti*, 'Is there a colour in air, or not? Is air a locus of colour, or not?' The same doubt is expressed in two ways, corresponding to the two types of absence: constant absence and mutual absence.

CHAPTER VII

PERVASION BETWEEN PARTICULARS

§ 1. *Definitions* (23–25)

130.2 *Yad vā pratiyogi-vyadhikaraṇa-sva-samānâdhikaraṇâtyantâbhāvâpratiyo-*
*131.1 *ginā sāmānādhikaraṇyaṃ, yat-samānâdhi*karaṇânyonyâbhāva-pratiyogi*
yadvan na bhavati tena samaṃ tasya sāmānādhikaraṇyaṃ vā, sva-samānâ-
*132.1 *dhikaraṇânyonyâ*bhāvâpratiyogi-yadvatkatvaṃ vā. Anya-vṛtti-vahni-tad-*
*133.1 *vator anya-vṛtti-dhūmavan-niṣṭhâtyantâbhāvânyonyâbhāva-pratiyogi*tvād*
vyadhikaraṇa-vahni-dhūmayor na vyāptiḥ, kiṃ tu tat-tad-dhūmasya samā-
*134.1 *nâdhikaraṇa-tat-tad-vahninā. Na câivaṃ dhūma-mātre na vyāptir* iti*
*135.1 *vācyaṃ, sarva-dhūma-vyaktes tathātvena dhūma-mātrasya vyā*pyatvāt.*
*136.1 *Dhūma-sambandhi-vahnis tad-vyāpya eva. Yugapad-utpanna-*vinaṣṭayoś*
ca vyāptir eva.

130.2–136.2. Or again, [pervasion is] (23) the fact that a thing shares a locus with what is not the counterpositive of a constant absence which shares a locus with that thing and differs in locus from its counterpositive; or (24) the fact that that which mutual absence shares a locus with shares

a locus with that whose locus is not the counterpositive of that mutual absence; or (25) the fact that a thing has an other thing's locus which is not the counterpositive of a mutual absence which shares a locus with the first thing. There is, then, no pervasion between a fire and a smoke which have a different locus, since the fire that occurs in one place and the locus of that fire are the respective counterpositives of a constant absence and a mutual absence which reside in the locus of the smoke that occurs in another place; but there is pervasion of this or that smoke by this or that fire having the same locus. One should not object that at that rate no pervasion [by fire] would belong to the whole of smoke. For, every individual smoke being thus [pervaded], the whole of smoke will be pervaded [by fire]. The fire connected with smoke is that which is pervaded by it. Pervasion is also between things that arise and disappear simultaneously.

130.2. *Yad vā*, 'or again', introduces a group of three definitions of pervasion which, in contrast with the preceding definition, do not require the assumption of a universal absence such as was described in the previous chapter, since they mention merely the counterpositive of an absence, and not what is determined by a limitor of the counterpositiveness to an absence. G. shows that when we dismiss the universal absence he can give us three correct definitions of pervasion similar to his conclusive definition; but the terms of the pervasion thus defined will be different from those of the pervasion that is object of the conclusive definition. The second definition (24) he offers plainly resembles the conclusive definition (22); only it uses as the absence which shares a locus with the pervaded thing not constant absence but mutual absence, which, as will be explained in § 2, is not susceptible of incomplete occurrence and therefore does not need the qualification of not sharing the locus with its counterpositive (definition (22)), or of differing in locus from its counterpositive (definition (23)). A conclusive definition like (22), involving the admission of a universal absence, has not been framed with mutual absence, probably because the universal to be opposed to the thing determined by the limitor of the counterpositiveness to a mutual absence would be locus of the term of pervasion, not the term itself, which we must put as a universal if we aim at defining a relation between universals.

130.2–3. *pratiyogi-...sāmānādhikaraṇyam.* Definition (23) may be formulated thus (cf. definition (22), ch. V, note on 100.2–4): There is per-

vasion of A by B if, and only if, A shares a locus with B in such a way that B is not the counterpositive of a constant absence which shares some locus with A and differs in locus from its counterpositive; in other words, there is pervasion of A by B if, and only if, A has a common locus with B in such a way that B is none of the things that are completely absent from some locus of A. Anything that is completely absent from some locus of A is either an individual that is completely absent from that locus or a set of individuals which are completely absent from that locus. If B is no such thing, then it must occur in *every* locus of A, i.e. an instance (individual) of B must be present in *every* locus of A, since complete constant absence (i.e. the very absence which is contradictory to presence or occurrence) of B in *some* locus of A is contradictory to occurrence of B in *every* locus of A. Thus the definition implicitly states that there is pervasion of A by B if, and only if, A has a common locus with B in such a way that B occurs in every locus of A. Clearly, then, definition (23) is logically correct, just as definition (22) was.

130.2. *pratiyogi-vyadhikaraṇa*, 'differing in locus from the counterpositive', 'having the locus different from the locus of the counterpositive', to be taken in the sense of *pratiyogy-asamānâdhikaraṇa* of the conclusive definition (ch. V, note on 100.2–4). An explanation of these qualifications of a constant absence is given by G. in § 2.

130.2. *sva* naturally refers to the subject of *sāmānādhikaraṇya* (having a common locus, sharing a locus with); this is the subject of pervasion, which we indicate by the letter A (cf. ch. V, note on 100.2–4). B, denoting the term of pervasion, is that which is *-apratiyogin* (what is not the counterpositive etc.).

130.3–131.2. *yat-samānâdhikaraṇa-. . . sāmānādhikaraṇyaṃ vā.* Definition (24) may be formulated in the following way: There is pervasion of A by B if, and only if, A shares a locus with B in such a way that locus of B is not the counterpositive of a mutual absence which shares some locus with A; in other words, there is pervasion of A by B if, and only if, A has a common locus with B in such a way that locus of B is not something different from some locus of A. Anything different from some locus of A is either an individual different from that locus or a set of individuals different from that locus. If locus of B is no such thing, then for any locus of A there must be an instance (individual) of locus of B which is identical with it, i.e. every locus of A must be identical with some locus of B. The

definition then implicitly states that there is pervasion of A by B if, and only if, A has a common locus with B in such a way that for any locus of A there is a locus of B which is identical with it, i.e. wherever there is A there is B. Thus the definition is logically correct. The structure of definition (24) is similar to that of definition (22) (ch. V).

131.2–132.1. *sva-...-yadvatkatvaṃ vā.* What definition (24) expresses in a sentence is here conveyed by a single word, an abstract of a bahuvrīhi with the samāsānta *ka* (cf. ch. IV, § 3, note on 74.1–2). The suffix *ka* affixed to *yadvat* signifies the possession of a locus of an other thing, i.e. the having a common locus with another thing; so it stands for the relation of *sāmānādhikaraṇya* mentioned in the preceding definitions. The use of a bahuvrīhi with *-ka* will be justified in § 3 of this chapter. The precise meaning of definition (25) is this: There is pervasion of A by B if, and only if, A has a locus of B such that locus of B is not the counterpositive of a mutual absence which shares some locus with A; in other words, there is pervasion of A by B if, and only if, A has a locus of B such that locus of B is not something different from some locus of A. For the implied meaning see the preceding note. The definition is logically correct.

sva refers, as in definition (23), to the subject of pervasion (=A); this is the subject to which the abstract property expressed by the definition belongs.

yad in *yadvatkatva* refers to the term of pervasion (=B, term in the strict sense). M. (138.2–3) observes that the words to be supplied in thought are *yasya tasya tad-vyāpyatvam*, i.e. the thing to which it (the abstract property expressed by the definition) belongs is that which is pervaded by that other thing. *tad* (that other thing) in *tad-vyāpyatva* refers to *yad* in *yadvatkatva*.

132.1–136.1. *Anya-vṛtti-vahni-...vyāptir eva.* The object of this passage is to show the difference between the three definitions just described and the conclusive definition in their application to the example of a true inference 'It has fire because it has smoke' (*vahnimān dhūmāt*), where the terms are classes containing several members (*nānā-vyakti*, p. 5). Each of the three definitions applies in that case of inference just as the conclusive definition does. Definition (23) applies, because fire (though not all fire) is not something that is completely absent from some locus of smoke. Definitions (24) and (25) apply, because locus of fire (though not

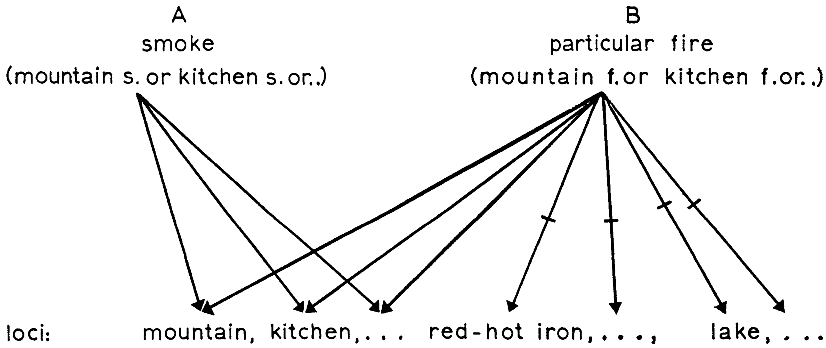
of all fire) is not something different from some locus of smoke. Thus in respect of applicability to true inferences (and in respect of inapplicability to false inferences) these definitions and the conclusive definition are alike, since they all are correct. But as regards the kinds of thing which the terms of pervasion stand for, there is a difference between the present definitions (23–25) and the conclusive definition (22). The difference is due to the fact already noticed, that definition (22) deals with a universal absence whose counterpositive represents a universal, while definitions (23–25) are concerned with particular absences whose counterpositives are individuals or sets of individuals. The term of pervasion which the definitions oppose to the counterpositive of the absence they contain will stand for the class denoted by the term or for certain members of that class according as the counterpositive of the absence represents a universal or a mere aggregate of particulars. Definitions (23–25) are therefore concerned with collections of particulars (individuals), and the pervasion defined by them is rightly called pervasion between particulars (*viśeṣa-vyāpti*). To take the example, suppose there are three particular instances of smoke: mountain smoke, kitchen smoke and hearth smoke, and four particular instances of fire: mountain fire, kitchen fire, hearth fire and red-hot iron fire. Now mountain smoke entails mountain fire, and vice versa, kitchen smoke entails kitchen fire, and vice versa, hearth smoke entails hearth fire, and vice versa, but red-hot iron fire does not entail, nor is entailed by, a corresponding instance of smoke, for in red-hot iron there is no smoke. Thus pervasion will be between mountain smoke, kitchen smoke and hearth smoke on the one hand, and mountain fire, kitchen fire and hearth fire on the other. This G. expresses by saying that there is pervasion of this or that smoke by this or that fire which has the same locus; here 'this or that' stands for particular things known to us, to which we give the general name of smoke and fire respectively. Thus when we maintain, on the basis of these definitions, that fire pervades smoke, we do not mean that the class of fires pervades the class of smokes, but merely that this or that fire pervades this or that smoke, i.e. a set of *particular* fires pervades a set of *particular* smokes. We have supposed the instances of smoke to be three in number. The set of these instances is then the whole which we call smoke (*dhūma-mātra*). This whole is, as we have seen, pervaded by fire. That is why we can say that fire pervades smoke. But we cannot say that smoke pervades fire, for not all four of the

supposed instances of fire entail an instance of smoke. Therefore we can only say that this or that fire is pervaded by smoke, this or that fire being the instances of fire that are connected with instances of smoke. The class of particular fires and the class of smokes, which pervade each other, are equinumerous. Cf. M. 130.16–131.17.

We shall now illustrate the application of definitions (23–25) to the above example in the same way as we did for definition (22) (ch. V).

Example of a true inference: It has fire because it has smoke (*vahnimān dhūmāt*).
Class of smokes: mountain smoke, kitchen smoke, ...
Class of fires: mountain fire, kitchen fire, ...red-hot iron fire, ...

(a) *Definition* (23)

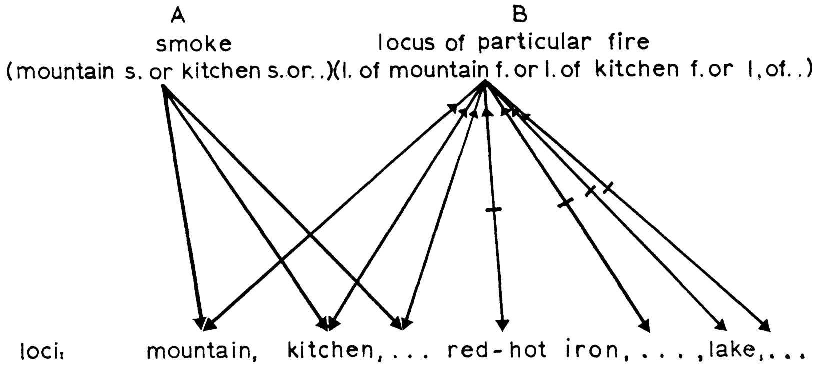


A fire (mountain fire or kitchen fire or ... but not red-hot iron fire etc.) occurs in every locus of smoke; on the mountain this fire is mountain fire, in the kitchen this fire is kitchen fire, etc.. Thus there is not *constant absence of this or that fire* (*constant absence of mountain fire and constant absence of kitchen fire and constant absence of* ...) in some locus of smoke, i.e. this or that fire is not something that is absent from some locus of smoke. Accordingly there must be pervasion of smoke by fire (= this or that fire).

There is no pervasion of mountain smoke by kitchen fire, for kitchen fire is something that is absent from the locus of mountain smoke.

(b) *Definitions (24) and (25)*

Identity and its denial, mutual absence, are represented in the diagram by ↔ and ↮ respectively.



Whatever locus of smoke we may select, there is *a locus of a fire (locus of mountain fire or locus of kitchen fire or locus of ..., but not locus of red-hot iron fire etc.)* which is identical with it. Thus there is not *mutual absence of locus of this or that fire (mutual absence of locus of mountain fire and mutual absence of locus of kitchen fire and mutual absence of locus of ...)* in some locus of smoke, i.e. locus of this or that fire is not something different from some locus of smoke. Accordingly there must be pervasion of smoke by fire (= this or that fire).

There is no pervasion of mountain smoke by kitchen fire, for locus of kitchen fire is something different from the locus of mountain smoke.

135.1–136.1. *Yugapad-... vyāptir eva.* The set of instances of smoke and the set of instances of fire which pervade each other have the same locus, i.e. every instance of the one set has for its locus the locus of the corresponding instance of the other set. Or rather, any instance of the one set corresponds to an instance of the other set because their locus is the same. Not only do these two sets possess the same locus in the sense that the places in which they occur are the same (thus their pervasion is called spatial reciprocal pervasion (*daiśika-sama-vyāpti*, M. 140.4, cf. p. 98)), but they arise and disappear at the same time, i.e. every instance of the one set arises and disappears simultaneously with the corresponding instance of the other set (thus their pervasion is called temporal reciprocal pervasion (*kālika-sama-vyāpti*, M. 140.3)). Just as there is pervasion between things whose occurrence is limited to the same place, so there is pervasion between things whose existence is limited to the same time. But examples of an inference by means of temporal pervasion are rare in Navya-nyāya.

Definition (23) corresponds to the formula of definition (22), because the difference between universals and sets of individuals cannot be expressed in our symbolic language.

Definitions (24) and (25) may be represented by

(1) $(Ex)\,[(Ey)\,(Ay \wedge Ryx) \wedge (Ey)\,(By \wedge Syx)] \wedge$
$\wedge \sim(Ex)\,\{(Ey)\,(Ay \wedge Ryx) \wedge (w)\,[(Ey)\,(By \wedge Syw) \rightarrow (x \neq w)]\}.$

(1) is equivalent to the formula of pervasion (p. 32):

(2) $(x)\,[(Ey)\,(Ay \wedge Ryx) \rightarrow (Ey)\,(By \wedge Syx)] \wedge (Ex)\,(Ey)\,(Ay \wedge Ryx).$

Reciprocal pervasion is explained by

(3) $\perp(x)\,(y)\,\{[By \wedge Syx \wedge (Ez)\,(Az \wedge Rzx)] \leftrightarrow (Cy \wedge Syx)\} \rightarrow$
$\rightarrow \{(x)\,[(Ey)\,(Ay \wedge Ryx) \rightarrow (Ey)\,(By \wedge Syx)] \leftrightarrow$
$\leftrightarrow (x)\,[(Ey)\,(Ay \wedge Ryx) \leftrightarrow (Ey)\,(Cy \wedge Syx)]\}.$

If we replace (see example p. 123)
A by smoke,
B by fire,
C by mountain fire or kitchen fire or . . ., but not red-hot iron fire etc.,
R and S by contact,
then the antecedent of (3) is true,
so that pervasion of smoke by fire is both pervasion of smoke by this or that fire and pervasion of this or that fire by smoke.

§ 2. *The use of 'not sharing the locus with the counterpositive' or 'differing in locus from the counterpositive' as a qualification of constant absence. Why mutual absence does not need this qualification*

136.1 *Karmaṇi ca saṃyogâbhāvaḥ pratiyogy-asamānâdhikaraṇaḥ.*

142.1 *Yad vā pratiyogi-vaiyadhikaraṇyâvacchedakâvacchinnatvam atyantâbhāva--viśeṣaṇaṃ karmaṇi ca saṃyogâbhāvasya pratiyogi-vaiyadhikaraṇyâvac-chedakâvacchinnatvam eva.*

*145.1 *Na cânyonyâbhāvasyâvyāpya-vṛttitvam, abhedasyâbādhita-praty*abhi-jñānāt.*

136.1–2. [Occurring] in an action, absence of contact does not share the locus with its counterpositive.

142.1–3. Or rather we use as a qualification of constant absence 'being what is determined by a limitor of [the relational property of] differing in locus from the counterpositive.' [Occurring] in an action, absence of contact is that which is determined by a limitor of [the relational property of] differing in locus from the counterpositive.

142.3–145.1. Mutual absence, on the other hand, is not of incomplete occurrence, for no one can object to the recognition of the non-difference [of the tree from locus of contact with a monkey].

136.1–2. *Karmaṇi...-asamānâdhikaraṇaḥ*. The theory I have described in my note on 71.4–72.4 (chapter IV, § 2) as G.'s is based on this passage, where, as in 100.2, *pratiyogy-asamānâdhikaraṇa* is supposed to mean 'not sharing the locus with the counterpositive'. According to that theory there is one constant absence of contact, which is either of incomplete occurrence or of complete occurrence. Incomplete occurrence of something exists only in substances, complete occurrence in all things other than substances (cf. p. 9). Any constant absence occurring in actions will therefore be of complete occurrence, i.e. it will be an absence not sharing these loci with its counterpositive. Contact can be this counterpositive, for contact is absent from actions. Thus the same absence of contact which incompletely occurs in substances completely occurs in actions. Now actions are loci of reality. Contact is therefore one of the things that are completely absent from some locus of reality. According to the definitions containing *pratiyogy-asamānâdhikaraṇa* (def. 22) or *pratiyogi-vyadhikaraṇa* (def. 23) as a qualification of constant absence, then, there will be no pervasion of reality by contact. Hence these definitions will not be so wide as to apply in the case of a false inference such as It has contact because it has reality (*saṃyogī sattvāt*, cf. note on 71.4–72.4 and p. 115).

But *pratiyogy-asamānâdhikaraṇa* (100.2) and *pratiyogi-vyadhikaraṇa* (130.2) may also be taken to mean 'sharing *no* locus with the counterpositive'. Then there will be, if we adopt G.'s theory, no such absence of contact, for absence of contact incompletely occurs in substances, sharing these loci with its counterpositive 'contact'. Contact will therefore not be one of the things that are completely absent; a complete absence of contact will not exist at all. Definitions (22) and (23), then, will be so wide as to apply in the false inference 'It has contact because it has reality', for

contact cannot be one of the things that are completely absent from some locus of reality. The overpervasion, mentioned in 71.4–72.2 (ch. IV, § 2), will take place.

To avoid this overpervasion due to the ambiguity of the qualifications of constant absence used in the definitions, G. proposes another way of qualifying constant absence, which seems not to be open to the above objection. We find it in the next passage.

142.1–3. *pratiyogi-...-avacchinnatvam eva.* Let A be a constant absence, B its counterpositive and X a locus in which B occurs. Then either (1) A occurs in X or (2) A does not occur in X. In case (1) there is between A as subject and B as term the relation of having a common locus with the counterpositive (*pratiyogi-sāmānādhikaraṇya*); in case (2) there is between them the relation of differing in locus from the counterpositive (*pratiyogi-vaiyadhikaraṇya*). The limitor of the relational property (see p. 13) is in either case absenceness of B, since A is absence of B and the class character of the subject (A) serves as a limitor of the relational property. What is determined by this limitor is absence of B, to be taken as a unit class. Now in case (1) we can replace B by contact when X is a substance; for absence of contact occurring in substances has a common locus with contact. In case (2) we can replace B by contact when X is an action; for absence of contact occurring in actions differs in locus from contact. The limitor of the relational property is in either case the same thing, viz. absenceness of contact, and what is determined by the limitor is the same absence of contact. Definitions (22) and (23) are now taken to contain as a qualification of constant absence 'being what is determined by a limitor of the relational property of differing in locus from the counterpositive'. We have shown that an absence whose counterpositive is contact, when occurring in an action, is so qualified. Thus contact is one of the things that are absent from some locus of reality, and are absent in the sense intended; so that the definitions cannot apply in the false inference It has contact because it has reality.

142.3–145.1. *Na câ...-pratyabhijñānāt.* Mutual absence is incapable of being of incomplete occurrence (*avyāpya-vṛttitva*), and therefore need not be qualified by 'not sharing the locus with the counterpositive' or 'differing in locus from the counterpositive'. If, for instance, mutual absence of locus of contact with a monkey were of incomplete occurrence, the tree would be both (a) different from locus of contact with a monkey

and (b) identical with locus of contact with a monkey. (For the example see p. 9). But (a) is contradictory to (b). Hence the product of (a) and (b) cannot exist, and the tree must be either (a) or (b), instead of both (a) and (b). The tree is (b), for contact with a monkey occurs in the tree. This means that there is non-difference (*abheda*) of the tree from locus of contact with a monkey. The tree not being (a), mutual absence of locus of contact with a monkey cannot be of incomplete occurrence. The same applies to mutual absence of locus of absence of contact with a monkey; so that locus of mutual absence of locus of absence of contact with a monkey is locus of mutual absence of locus of contact with a monkey; this locus cannot be the tree.

The above argument rests on the assumption that locus of contact (or locus of absence of contact) refers in (a) to the same thing as in (b); otherwise (a) could not be contradictory to (b). The thing referred to is the whole tree, not that part of it which is really in contact (or not in contact) with the monkey (cf. p. 9). G.'s view is then the opposite of what he maintains in his refutation of definition (10) (72.4–74.1, ch. IV, § 3), where the limitors of the locusness are to be taken into account (cf. note on 73.2). The view he here adopts is no doubt the natural one, since in speaking of locus we definitely mean by this the thing itself, not a part of the thing.

If mutual absence were of incomplete occurrence, definitions (24) and (25) would fail to apply in a true inference such as It has contact with a monkey because it is this tree (*kapi-saṃyogy etad-vṛkṣatvāt*); for this tree would be the locus of mutual absence of locus of contact with a monkey, so that locus of contact with a monkey would be something different from the locus of this-treeness; there would be no pervasion of this-treeness by contact with a monkey.

§ 3. *The genetive in the analysis of definition* (25)

145.1 *Vyāpya-vyāpaka-bhāvâjñāne 'pi vastu-satas tathātvenâjñāyamānasya saṃbandhatvenâiva bhātasya ṣaṣṭhy-arthatvaṃ.*

145.1–2. [In the analysis of definition (25),] though we are unacquainted with the relation of pervader and pervaded, [we use a genetive;] the genetive signifies an actual entity which is not known in its real nature but appears to us merely as a connexion.

145.1–2. For the understanding of this passage we must return to definition (10) (ch. IV, § 3), whose analysis is considered in 74.1–3 (I quote my translation): 'Further, the genetive "whose" in the analysis "whose locus of the probandum is not the counterpositive of a mutual absence residing in a locus of the probans" signifies the relation of pervader and pervaded, which has not yet been examined but is definiendum'. The verbal form of definition (25) is the same as that of definition (10), viz. a bahuvrīhi with the samāsānta *ka*, which, as we have explained there (note on 74.1–2), is analysed by means of the genetive case (*ṣaṣṭhī*). The genetive naturally expresses the relation of possession. While in 74.1–3 G. considers this relation to be a kind of pervasion (thus in using definition (10) we should commit the error of defining pervasion by means of pervasion), here, with regard to definition (25), he treats the same relation as being not pervasion as such but merely a connexion whose specific nature remains undetermined. So he justifies the defining of pervasion by the use of a bahuvrīhi with *-ka*, on the ground that such a definition does not really include pervasion in the definitory formula which is got by the analysis of the compound with the help of the genetive case. For definition (25) this formula would be: 'being a thing whose locus of another thing is not the counterpositive of a mutual absence sharing a locus with it.'

§ 4. *Pervasion is adequately defined as something that is not a mere generality*

146.1 *Na câivam ananugamo doṣāya, kasya kā vyāptir ity ananugatasyâiva lakṣyatvāt.*

146.1–2. If pervasion is defined in the above manner, the lack of generality [from which the definition suffers] will not be a mistake, since the question 'Which pervasion of what?' shows that the thing to be defined is not a mere generality.

146.1–2. Suppose someone asks G. to define pervasion. He then says: 'What is pervasion?' He may expect G. to answer that pervasion is 'having a locus which is not the counterpositive of a mutual absence', just as we say that pervasion is 'invariable concomitance'. But G. answers: 'Pervasion is the fact that a thing has another thing's locus which is not the

counterpositive of a mutual absence which shares a locus with the first thing' (definition (25), cf. M. 148.9). Superficially it looks as if G. defined pervasion incorrectly, because the definition seems to be inadequate to the definitum in respect of generality. The definitum is put forward as a mere generality: pervasion, whereas the definition uses, besides constants expressing generalities (locus, counterpositive, mutual absence), the pronouns *sva* and *ya* (which we may translate by 'a thing', 'another thing', 'the first thing'), which play the part of variables denoting particulars (see p. 23). But in fact the definitum does not represent a generality which may be expressed with no regard to the things to which it applies; on the contrary, it is a relation which cannot be definitely expressed without indicating that it attaches to certain pairs (smoke, fire; substanceness, reality; ... etc.). The necessity of mentioning explicitly the terms of pervasion requires the use of *ya*, *ta* or *sva*; these pronouns function then as variables which we can replace by the particular classes (sets of particulars) between which pervasion exists. That pervasion is a relation predicable only of particular pairs becomes clear if we inquire about a given pervasion. We put then the question: 'Which pervasion of what?', where the interrogative pronouns correspond exactly to the demonstrative, relative or reflexive pronouns used in the definitions of pervasion.

ananugama and *ananugata* are the negatives of *anugama* and *anugata*. As logical terms *anugama* and *anugata* are difficult to translate. Their meaning of 'following' must be applied to 'one nature running through the many individuals, to which all conform' (Randle, p. 135 note 1). Thus they indicate generality. In this sense *anugama* is used of potness, which is the general nature of all pots (Nyāyakośa). The Tarkasaṃgraha (Foucher, p. 164) defines *sāmānya* (Ingalls: class character; Foucher: 'généralité') as *nityam ekam anekânugatam* (Foucher: 'l'éternelle, une, inhérente à plusieurs'). 'Generalization' and 'comprehensiveness', which we find in Satischandra as translations of *anugama*, express its meaning no more precisely than 'generality' does.

146.1. *kasya kā vyāptir iti*, 'Which pervasion of what?', i.e. 'Pervasion of what by what?'. *kasya* refers to the pervaded thing, which is subject term of the relation of pervasion. *kā*, which belongs adjectively to *vyāpti*, refers to the other term, the pervader, which is thought of as specifying pervasion.

§ 5. *When a pair of things is absent the counterpositive of that absence is both things taken together*

146.2 *Atha dhūmavati vahni-hradau na *staḥ, dhūmavān vahnimaddhradau na*
*147.1 *bhavatîti-pratīter vyāsajya-vṛtti-pratiyogikau vahni-vahnimator atyantâny-*
*148.1 *onyâbhāvau*dhūmavati vidyete iti katham ete lakṣaṇe iti cet,*
na, tadṛśâbhāvânabhyupagamāt, abhyupagame vā tatra tad-ubhayaṃ pratiyogi na vahni-vahnimantau.

146.2–148.1. [Objection.] 'Fire and lake are not together in a locus of smoke, and no locus of smoke is a locus-of-fire and a lake together. These facts are known by distinct knowledge. Thus there are in a locus of smoke constant absence of fire and mutual absence of locus of fire; the counterpositives of these absences are things that in their occurrence [in a locus] adhere to each other. How then can pervasion be defined by those definitions [that negate either such a constant absence or such a mutual absence]?'

148.1–3. [Answer.] No; we do not admit such absences, or if we admit them their counterpositives will be both the things [taken together], not fire or locus of fire [without lake].

146.2–147.1. *vahni-hradau*, 'fire and lake', and *vahnimaddhradau* 'locus-of-fire and lake', are dvandva compounds (copulative compounds). A dvandva denotes concatenation. We express this notion by 'together'.

147.1–2. *vyāsajya-vṛtti*, 'whose occurrence takes places after adhering', is a bahuvrīhi. It is used to signify things that in their occurrence in a locus adhere to each other, i.e. that occur as a pair (or as a number of three etc.) in their locus. The first member of the compound must be taken to be a gerund in *-ya* (as *vyāpya* in *vyāpya-vṛtti*, see p. 9). Abstracts such as bothness (*ubhayatva*), which are properties of things that are *vyāsajya-vṛtti*, are called in the commentaries *vyāsajya-vṛtti-dharma* (M. 148.12–14, cf. Ingalls p. 77).

148.1. *ete lakṣaṇe*, 'those two definitions', i.e. those two types of definition, the one being the negation of a constant absence (definitions (22) and (23)), the other the negation of a mutual absence (definitions (24) and (25)).

148.2–3. *tādṛśâ...-vahnimantau.* The opponent claims (147.1-148.1)

that an absence of fire and lake has as its counterpositive both fire and lake, so that we can say that there is a constant absence of fire in a locus of smoke, just as we can say that there is a constant absence of lake in a locus of smoke; and the same must be said, mutatis mutandis, of a mutual absence of locus-of-fire and lake. G. refuses to admit these absences. The reason for his refusal must be that the two things which form the counterpositive exclude each other by nature and therefore cannot be coupled for an occurrence anywhere. If such absences are none the less admitted, then their counterpositives must be treated as being both the things together.

A constant absence of fire (=B) and lake (=C) in a locus of smoke (=A) may be represented symbolically as follows:

(1) $(Ex)\{(Ey)(Ay \wedge Ryx) \wedge \sim[(Ey)(By \wedge Ryx) \wedge (Ey)(Cy \wedge Ryx)]\}$.

A mutual absence of locus-of-fire and lake in a locus of smoke then is represented by

(2) $(Ex)\{(Ey)(Ay \wedge Ryx) \wedge$
$\wedge \sim[(Ew)(Ey)(By \wedge Ryw \wedge (w=x)) \wedge (Ew)(Cw \wedge (w=x))]\}$.

Wherever there is an absence of fire there is an absence of fire and lake, but not vice versa. This we convey as follows:

(3) $\perp(x)\{\sim(Ey)(By \wedge Ryx) \rightarrow$
$\rightarrow \sim[(Ey)(By \wedge Ryx) \wedge (Ey)(Cy \wedge Ryx)]\}$.

§ 6. *Pervasion defined as a relation without an accident*

149.1 *Athavânaupādhikatvaṃ vyāptiḥ tac ca yāvat-sva-samānâdhikaraṇâtyantâ-*
150.1 *bhāva-pratiyogitâvacchedakâvacchinnaṃ yat *tat-pratiyogikâtyantâbhāva-*
-samānādhikaraṇaṃ yat tena samaṃ sāmānādhikaraṇyam. Na hy evaṃ
151.1 *sopādhiḥ, tatra *sādhana-samānâdhikaraṇâtyantâbhāva-pratiyogini ārdrên-*
152.1 *dhanavattvâder upādher yo 'tyantâbhāvas tena samaṃ sādhyasya *dhūm-*
âdeḥ sāmānādhikaraṇyâbhāvāt, upādheḥ sādhya-vyāpakatvāt. Etad eva
yāvat-sva-vyabhicāri-vyabhicāri-sādhya-sāmānādhikaraṇyam anaupādhi-
katvaṃ gīyate.
153.1 *Yad vā yāvat-samānâdhikaraṇâtyantâbhāvâpratiyogi-*pratiyogikâtyantâ-*
154.1 *bhāvâsāmānādhikaraṇyaṃ yasya tasya tad evânaupādhikatvaṃ, sopādhau*

*155.1 *tu sādhyavan-niṣṭhâtyantâbhā-*vâpratiyogina upādher yo 'tyantâbhāvas tena samaṃ hetoḥ sāmānādhikaraṇyam upādheḥ sādhanâvyāpakatvāt.*

149.1–152.3. Or rather pervasion is 'being independent of an accident'. This is (26) the fact that a thing shares a locus with what shares a locus with a constant absence whose counterpositive is that which is determined by all limitors of counterpositiveness to constant absence sharing a locus with that thing. This is not true of a probans with an accident, since then, the accident being a pervader of the probandum, the probandum, say, smoke, does not share a locus with the constant absence of the accident 'being a locus of wet fuel', which is the counterpositive of a constant absence sharing a locus with the probans [(fire)]. This [definition] expresses the same as the so-called 'being independent of an accident', which is (27) 'the probans' sharing a locus with the probandum from which deviate all things that deviate from the probans'.

153.1–155.2. Or 'a thing's being independent of an accident [in its connexion with another thing]' is the following property: (28) the thing's not sharing a locus with a constant absence whose counterpositive is all that is no counterpositive of a constant absence sharing a locus [with the other thing]. In the case of a probans with an accident, however, the accident not being a pervader of the probans, the reason does share a locus with the constant absence of the accident, which is not the counterpositive of a constant absence residing in a locus of the probandum.

149.1. *anaupādhikatva*, 'being independent of an accident'. This type of definition which identifies pervasion with the negation of an accident has been discussed in § 5 of chapter IV. Two formulations have been given there, corresponding to the two ways in which the statement 'There is an attribute which pervades the probandum and does not pervade the probans', which is definitory of accident, can be contradicted (see note on 79.4–80.2): (a) No attribute that pervades the probandum does not pervade the probans, i.e. any attribute that pervades the probandum pervades the probans (cf. note on 80.2–4); (b) No attribute that does not pervade the probans pervades the probandum, i.e. any attribute that does not pervade the probans does not pervade the probandum. But since instead of 'probans' and 'probandum' we are now using the variables A and B, formula (a) must take the form 'Any attribute that pervades B pervades A', and

formula (b) the form 'Any attribute that does not pervade A does not pervade B'. The fact that a thing does not pervade another thing is just the fact that the other thing is absent from some locus of the first thing, i.e. the first thing shares a locus with a constant absence whose counterpositive is the second thing. Therefore (b) will be expressed by saying that B shares a locus with a constant absence whose counterpositive may be any attribute which is the counterpositive of a constant absence sharing a locus with A. Similarly (a), whose converse per contrapositionem is (b), will be expressed by saying that A does not share a locus with a constant absence whose counterpositive may be any attribute which is not the counterpositive of a constant absence sharing a locus with B. Of the three definitions put forward by G. in the present paragraph, the first (26) and second (27) are in the form of (b), and the third (28) in the form of (a).

149.1–150.2. *yāvat-. . .sāmānādhikaraṇyam.* Definition (26) may be rendered thus: There is pervasion of A by B if, and only if, A shares a locus with B in such a way that B shares a locus with a constant absence whose counterpositive is that which is determined by all limitors of counterpositiveness to constant absence sharing a locus with A. If we simplify this formulation by using our own terminology (cf. chapter V, note on 100.2–4), we get the following formula: There is pervasion of A by B if, and only if, A has a common locus with B in such a way that anything that is qua class absent from some locus of A is as such absent from some locus of B. This formula consists of two statements. (1) If there is pervasion of A by B, then A has a common locus with B in such a way etc.. (2) If A has a common locus with B in such a way etc., then there is pervasion of A by B. (1) is evidently true; for if there is pervasion of A by B, then every locus of A is a locus of B; so that anything that is qua class absent from some locus of A is as such absent from some locus of B. That (2) is true follows from the fact that B itself cannot qua class be absent from some locus of B; by combining this with the sentence 'Anything that is qua class absent from some locus of A is as such absent from some locus of B' we infer, tollendo tollens, that B is not qua class absent from some locus of A; and what is not qua class absent from some locus of A must be a pervader of A (cf. p. 111); therefore B must pervade A. The definition, then, is correct.

149.1–2. *yāvat-. . .yat.* Definition (26) has affinities with definition (22) in so far as it ascribes to the counterpositive of a constant absence the

character of a universal. The use of *avacchedakâvacchinna* (determined by a limitor) has been explained in my note on 100.2–4 and in p. 13. *yāvad* belongs to *avacchedaka* (M. 153.5–6). The thing determined by all limitors of counterpositiveness to a constant absence sharing a locus with A is the set of things that are universally, i.e. qua class, absent from some locus of A.

150.1–2. *tena samaṃ sāmānādhikaraṇyam.* The pervaded thing must, in any definition of pervasion, be represented as the subject of the relation (see p. 6). This is achieved (as in definitions (22) and (23)) by using the relational abstract 'having a common locus (*sāmānādhikaraṇya*) with that (*tena samam*)'; 'that' (*tena*) refers to the 'which' (*yat*) that precedes it and indicates the pervader, so that 'having a common locus' (*sāmānādhikaraṇya*) must have for its understood subject the pervaded thing, which is indicated by the reflexive pronoun *sva-* (149.1). Cf. note on 100.2–4, p. 111.

150.2–152.2. *Na hy...sādhya-vyāpakatvāt.* Take the false inference 'It has smoke because it has fire'. Its probandum is smoke, its probans fire, and in loci of its probans, in so far as these are loci of the probandum, there is an accident (*upādhi*, p. 14), which is usually described simply as wet fuel (*ārdrêndhana*), but here – which amounts to the same – as the property of being a locus of wet fuel (*ārdrêndhanavattva*). In using this abstract property instead of the concrete thing G. points out that absence of wet fuel must be a universal absence, i.e. an absence of the thing qua class. Wherever there is constant absence of the property of being a locus of wet fuel there is constant absence of wet fuel in the sense of absence of wet fuel qua class, and vice versa. Now wet fuel is absent from a locus of fire, viz. red-hot iron, but it is not absent from a locus of smoke, since it pervades smoke. There is therefore something that is absent from some locus of fire and is not absent from some locus of smoke. Then according to definition (26) smoke cannot pervade fire. The definition is correct because its opposite applies in a false inference. The subject of pervasion cannot be a probans with an accident (*sopādhi*).

152.2–3. *Etad...gīyate.* We have shown (note on 149.1) that definition (26) corresponds to the statement 'Any attribute that does not pervade the probans does not pervade the probandum'. Since non-pervasion is here the same as deviation (*vyabhicāra*, p. 7), this statement is also expressed by saying 'Any attribute that deviates from the probans deviates from the probandum.' Thus definition (26) is said to express the same as

the 'being independent of an accident' which contains the statement using deviation (definition (27)). This 'being independent of an accident' is the definition given by the Old School (*prācīnāḥ*, M. 156.8). Of course it is not formulated in accordance with G.'s view of definition, which implies that probans and probandum should not be used as terms in a definition of pervasion (cf. ch. IV, § 12).

152.2. *yāvat-sva-vyabhicāri-vyabhicāri* is a bahuvrīhi qualifying *sādhya.* It means 'having as things that deviate from it all things that deviate from the subject (probans)'. Cf. note on 150.1–2.

153.1–154.2. *yad vā...anaupādhikatvaṃ.* Definition (28) may be rendered thus: There is pervasion of A by B if, and only if, A does not share a locus with a constant absence whose counterpositive is all that is no counterpositive of a constant absence sharing a locus with B. This we can formulate as follows: There is pervasion of A by B if, and only if, anything that is not absent-from-some-locus-of-B is not absent-from-some-locus-of-A. Now anything that is denied to be absent from some locus of A must be present in every locus of A. (cf. p. 111). It does not matter whether the absence denied is that of the thing qua class or of a particular instance of the thing; in either case the thing will be present, since for a thing to be present it is enough that a single instance of the thing is present (cf. p. 111); this may be the reason why the limitors of counterpositiveness to absence, which we found in definition (26), have not been introduced here. Thus our formula of definition (28) consists of the following two statements: (1) If there is pervasion of A by B, then anything that is present in any locus of B is present in any locus of A; (2) If anything that is present in any locus of B is present in any locus of A, then there is pervasion of A by B. (1) is evidently true; for if there is pervasion of A by B, then any locus of A is a locus of B. (2) is true, because B itself is one of the things that are present in any locus of B and therefore present in any locus of A; thus B must pervade A. The definition, then, is correct. The corresponding form which uses non-deviation is not mentioned here, but is found in chapter IV, § 5 (definition (13)).

154.2–155.2. *sopādhau...sādhanâvyāpakatvāt.* A probans with an accident (*sopādhi*) belongs to a false inference like 'It has smoke because it has fire' (see note on 150.2–152.2). The accident pervades the probandum and does not pervade the probans (cf. note on 149.1). Therefore, (1) it is not the counterpositive of a constant absence residing in a locus of the

probandum, i.e. it is not absent from some locus of the probandum, and (2) the reason (probans) shares a locus with its constant absence, i.e. the accident is absent from some locus of the probans. Thus in the case of a false inference there is something that is absent from some locus of the probans, while it is not absent from some locus of the probandum. If there is such a thing, then according to definition (28) the probandum cannot pervade the probans, since the definition requires that if the probandum is to pervade the probans, anything that is not absent from some locus of the probandum should not be absent from some locus of the probans. We cannot therefore say 'definition (28) is too wide because it applies in a false inference containing a probans with an accident'.

For the symbolic representation of definitions (26–28) I may refer to the formulae corresponding to definition (12), which are given under chapter IV, § 5.

§ 7. *Definition* (29)

156.1 *Yad vā yat-saṃbandhitâvacchedaka-rūpavattvaṃ yasya tasya sā vyāptiḥ.*
*157.1 *Tathā hi dhūmasya vahni-saṃbandhitve dhūmatvam *avacchedakaṃ dhūma-*
mātrasya vahni-saṃbandhitvāt, vahnes tu dhūma-saṃbandhe na vahnitvam
*158.1 *avacchedakaṃ dhūmâsaṃbandhini gatatvāt. *Na hy atiprasaktam avac-*
chedakam, saṃyogâdau tathātvâdarśanāt. Kiṃ tu vahnāv ārdrêndhana-
-prabhava-vahnitvaṃ dhūma-sambandhitâvacchedakaṃ tādṛśaṃ ca vyāpyam
*159.1 *eva. *Athavā yat-sāmānādhikaraṇyâvacchedakâvacchinnaṃ yasya *sva-*
*160.1 *rūpaṃ tat tasya vyāpyaṃ, vahni-sāmānādhikaraṇyaṃ hi dhūme dhūma-*
tvenâvacchidyate sopādhau tûpādhinā.

156.1–160.2. Or pervasion is (29) a thing's being connected [with another thing], which being connected has for its limitor the [class] character of the [first] thing. Thus smokeness is limitor in the connexion of smoke with fire, since the whole of smoke is connected with fire; but fireness is no limitor in the connexion of fire with smoke, since it is contained in things that are not connected with smoke. For what is too wide [because of its extension beyond the subject of the connexion] cannot be a limitor [in that connexion]. For instance, contact and similar properties are not seen to be such [limitors]. But fireness peculiar to fire-arising-from-wet-

fuel is for fire the limitor of its connexion with smoke; the thing of this nature is just the thing that is pervaded [by smoke]. Or rather, the thing pervaded by another thing is the thing whose own nature is determined by the limitor of [the property of] sharing the locus with that other thing. For [the property of] sharing the locus with fire, which belongs to smoke, is limited by smokeness; but when the [subject-]term has an accident, then the [property of] sharing the locus [with the other term] is limited by the accident.

156.1–2. *yat-saṃbandhitâ. . .sā vyāptiḥ*, 'pervasion is the being-connected-with-another-thing of that thing which has the property of possessing a class character which is the limitor of that being connected with another thing', i.e. 'pervasion is the being-connected-with-another-thing of a thing whose class character is the limitor of its being connected with that other thing' or 'pervasion is a thing's being connected with another thing, which being connected has for its limitor the class character of the first thing.' *yat-saṃbandhitā* in *yat-saṃbandhitâvacchedaka-rūpavattvam* is the antecedent of *sā*, which stands for *tat-saṃbandhitā* (M. 159.12). Since 'being connected' can be specified by that other thing with which its subject is connected (cf. § 4, note on 146.1), *yat-* in *yat-saṃbandhitā* (and *tat-* in *tat-saṃbandhitā*) may be taken as belonging adjectivally to *saṃbandhitā*. So we can translate *yat-saṃbandhitā* by 'which being connected'; *sā* is 'that being connected'. *tasya* refers to the immediately preceding *yasya*, and indicates the subject of the connexion. On the use of *avacchedaka* (limitor) see p. 13. *rūpa*, 'form', signifies the class character (forma sine subjecto, p. 13), e.g. smokeness, which is the class character of all smokes. Definition (29), then, states the same as definition (14) (cf. ch. IV, § 6, note on 83.1), viz. that pervasion is a connexion of one thing with another thing, which connexion comprises the whole of the first thing. This is clear from the examples that follow. The question whether pervasion is thus correctly defined cannot be answered till we know the precise meaning of *saṃbandhitā*. This word is as ambiguous as the word *sāmānādhikaraṇya*, with which it is taken to be synonymous (M. 159.12–13). In what sense then must the word be used if the definition is to be applicable to all cases of true inference as well as inapplicable to all cases of false inference? Not in the ordinary sense of 'having a common locus with', since then the definition would apply in the false inference It is a substance because it has reality (*dravyaṃ sattvāt*). For (1) reality

(*sattva*) has a common locus with substanceness (*dravyatva*), since it occurs in all substances, and (2) reality is as a whole connected with everything with which it is connected, since it is assumed to be a unit class (*eka-vyakti*, p. 5). So reality would be pervaded by substanceness, and our definition would be too wide. But if we take *saṃbandhitā* to mean 'sharing *all its loci* with,' i.e. 'sharing *the whole of its locus* with', then the definition will not be so wide as to apply in the above false inference; for reality does not share the whole of its locus (substances, qualities, actions) with substanceness. Nor will the definition apply in a false inference where the terms are classes containing several members (*nānā-vyakti*, p. 5). Take the false inference It has smoke because it has fire (*dhūmavān vahneḥ*). Mountain fire shares the whole of its locus (its locus is nothing but mountain) with mountain smoke; kitchen fire shares the whole of its locus (kitchen) with kitchen smoke. But red-hot iron fire does not share the whole of its locus with an instance of smoke, for there is no smoke in a red-hot iron. Thus fire is connected with smoke (i.e. there is fire which shares the whole of its locus with smoke), but this connexion does not comprise the whole of fire, red-hot iron fire being excluded from it. On the other hand, our definition will apply in the true inference It has fire because it has smoke (*vahnimān dhūmāt*). Mountain smoke shares the whole of its locus (mountain) with mountain fire; and so does kitchen smoke with kitchen fire. There is no instance of smoke which does not share the whole of its locus with an instance of fire. Thus smoke is connected with fire (i.e. there is smoke which shares the whole of its locus with fire), and this connexion comprises the whole of smoke; so that we can truly say that smoke is pervaded by fire. Clearly, then, definition (29) is correct, provided 'being connected with another thing' is understood as meaning 'sharing the whole of its locus with another thing.' The terms of the pervasion thus defined are treated as sets of particulars. Thus definition (29) is in its proper place in the chapter on Pervasion between particulars (cf. § 1, note on 132.1–136.1).

157.1. *dhūma-mātrasya*, 'the whole of smoke', cf. 133.2–135.1.

157.2. *dhūmâsaṃbandhini*, viz. red-hot iron fire. There is fire but no smoke in a red-hot iron.

158.1. *saṃyogâdau*, 'contact etc.'. Contact is a quality which inheres in all substances (p. 9). M. (161.13–14) brings under *-ādi* the most general properties such as 'being object of knowledge' (*prameyatva*).

158.3. *tādṛśaṃ*, 'the thing of this nature', viz. fire arising from wet fuel. This is mountain fire or kitchen fire etc..

158.3. *vyāpyam eva*. Cf. 135.1.

159.1. *Athavā*, 'or rather', introduces a correction rather than a new definition, since what will be defined is not pervasion (*vyāpti*) but the pervaded thing (*vyāpya*), which has just been considered.

159.1–160.1. *yat-sāmānādhikaraṇyâ*. . . *vyāpyaṃ*. *yat-* is the antecedent of *tasya*, which belongs as agent to *vyāpyam*. What is pervaded by another thing can only be a thing whose own nature is determined (*avacchinna*, p. 13) by the limitor (*avacchedaka*) of the property of sharing the locus (*sāmānādhikaraṇya*) with that other thing. *sāmānādhikaraṇya*, which we translate here by 'sharing *the* locus with', must be taken to mean the same as *saṃbandhitā* in the stricter sense of 'sharing all its loci with', 'sharing the whole of its locus with'. Cf. note on 156.1–2.

160.1. *svarūpa*, 'own form, own nature', signifies the nature of a class (forma cum subjecto, p. 13), e.g. smoke, which is the nature of all smokes, to be distinguished from the nature (*rūpa*, 156.1) which is the class character (forma sine subjecto), e.g. smokeness. The nature of a class is determined by the corresponding class character.

160.1–2. *vahni-*. . . *tûpādhinā*. Smoke is pervaded by fire, because its sharing the locus with fire is limited by smokeness, the class character which determines the own nature of all smokes. On the other hand, fire is not pervaded by smoke, because its sharing the locus with smoke is limited not by fireness, the class character which determines the own nature of all fires, but by the accident, viz. wet fuel or 'being a locus of wet fuel' (151.1–2). The accident (*upādhi*) is now said to be the limitor of the property of sharing the locus with the other term when the subject-term is something with an accident (*sopādhi*). An explanation of this will be given in the next paragraph.

Definition (29) may be represented symbolically, with *saṃbandhitā* in the sense of 'sharing the whole of its locus with', by the formula

(1) $(y)\{Ay \rightarrow (x)[Ryx \rightarrow (Ez)(Bz \wedge Szx)]\}$.

(1) is equivalent to the formula of pervasion:

(2) $(x)[(Ey)(Ay \wedge Ryx) \rightarrow (Ey)(By \wedge Syx)]$.

§ 8. *Corollaries from the final sentence of the preceding paragraph*

165.2 *Ata eva sādhanatâvacchedaka-bhinnena yena sādhanatâbhimate sādhya-*
-saṃbandho 'vacchidyate sa eva tatra sādhane viśeṣaṇam upādhir iti vadanti.
Ata eva ca tatra sādhanâvyāpakatve sati sādhanâvacchinna-sādhya-
-vyāpakatvaṃ lakṣaṇaṃ dhruvaṃ, vyabhicāriṇi sādhane ekatra sādhya-tad-
-abhāvayor virodhenâvacchedaka-bhedaṃ vinā tad-ubhaya-saṃbandhâbhā-
*166.1 *vād avaśyaṃ *sādhya-saṃbandhitâvacchedakam asti, tad eva ca sādhanâ-*
vacchinna-sādhya-vyāpakaṃ sādhanâvyāpakaṃ tatrôpādhiḥ, ata eva
vyabhicāre câvaśyam upādhir iti saṃgacchate. Anyathā vyabhicārād eva
tatrâgamakatvena vyabhicāritvena na tad-anumānam aprayojakatvāt.
*167.1 *Ata eva ca tasya sādhya-saṃbandhi*tâvacchedaka-rūpa-lakṣaṇā vyāptiḥ*
sādhanatâbhimate cakāstîti sphaṭike javā-kusumavad upādhir asāv ucyate.
Lakṣaṇam tu sādhya-sādhana-saṃbandha-vyāpakatve sati sādhanâvyāpaka-
tvaṃ, viṣama-vyāptas tu nôpādhi-pada-vācyaḥ pravṛtti-nimittâbhāvāt. Dūṣ-
*168.1 *akatā ca tasya vyabhicārônnāya*katayā. Na ca vyabhicārônnāyakatvam*
evôpādhitvam aprayojaka-sādhya-vyāpaka-vyabhicāriṇor apy upādhitvâ-
patter iti.

165.2–4. [Where we have a term with an accident there the property of sharing the locus with the other term is limited by the accident.] That is why (I) people say: 'An accident is that which serves as a qualifier for the probans; it is different from the limitor of probansness, and it limits the connexion with the probandum in what is thought of as being a probans.'

165.4–166.5. And that is why (II) the definition of accident 'not being a pervader of the probans and being a pervader of the probandum limited by the probans' is unassailable. Where the probans deviates [from the probandum], the probandum and its absence being contradictories in relation to one thing, a connexion with both the probandum and its absence would be impossible without different limitors; therefore the connexion of that probans with the probandum must have some limitor, and this limitor can only be something that (a) pervades the probandum limited by the probans and (b) does not pervade the probans; such a thing is the accident; hence it is true to say that an accident is necessarily involved in deviation; otherwise, since then the deduction of it from deviation alone would be unconvincing, we should be unable to infer it

from the [probans'] deviation [from the probandum], for our inference would be ineffective.

166.5–168.3. And that is why (III) this use of 'accident' is explained by the fact that the pervasion which belongs to the accident, and which is characterized by a nature which limits the connexion with the probandum, shines [by reflexion] in what is thought of as being a probans, just as [the redness of] a Hibiscus flower [shines by reflexion] in a crystal [near which the flower lies]. The definition of accident, however, is '(a) being a pervader of the connexion of probandum and probans and (b) not being a pervader of the probans.' But a pervasion term which is unequal [to the probandum] should not be signified by the word 'accident,' since the cause of application of the word is absent there. Such a term is indeed destructive inasmuch as it demonstrates deviation. But to demonstrate deviation is not the same as to be an accident; for if this were the case, (1) an ineffective [inference] and (2) what [as probans] deviates from a pervader of the probandum would as well be accidents.

We have seen in the preceding paragraph that pervasion is definable as a connexion between two things, in the sense that one thing shares the whole of its locus with another thing. The first thing, the subject of the connexion, is the thing that is pervaded (*vyāpya*). We call it the pervaded term, as opposed to the other term, the pervader (*vyāpaka*). If the pervaded term is a single class of things, then the corresponding class character is said to limit the connexion. Thus smokeness limits the connexion of smoke and fire, because smoke is connected with fire in virtue of its own nature, i.e. all smoke is connected with fire (157.1). But the pervaded term may also be a combination of two classes, of which one is regarded as the subject of the connexion in so far as it is associated with the other class, which is called the accident (*upādhi*). Then the accident is said to limit the connexion (160.2). The presence of the accident restricts the locus of the subject-term to such an extent that the whole of the restricted locus is shared with the other term, i.e. falls within the locus of the other term. Thus the accident originates a pervasion, which without the accident would not exist, since then the locus of the subject-term would extend beyond the locus of the other term. For instance, wet fuel limits the connexion of fire and smoke, because it is only in the presence of wet fuel that fire is connected with smoke; the common locus of fire and smoke is

delimited by wet fuel; there is fire without wet fuel and smoke, because locus of fire is wider in extension than locus of smoke. The fact that the accident is responsible for the pervasion of the term it accompanies may be taken as the starting-point of the three corollaries which form the last paragraph of the last chapter of G.'s Theory of pervasion. In these corollaries we find again the words 'probans' (*sādhana*) and 'probandum' (*sādhya*) used as terms of pervasion. According to G. the use of these words is allowed once pervasion has been defined.

165.2–3. *sādhanatâvacchedaka-bhinnena...'vacchidyate.* It is not the limitor of probansness (fireness, if the probans is fire) which limits the connexion with the probandum, as in the case of a genuine pervasion, but something different from that limitor.

165.2–3. *sādhanatâbhimate*, 'in what is thought of as being a probans', i.e. in what is not really a probans. For it is the accident that *proves* the presence of the probandum.

165.3–4. *tatra sādhane viśeṣaṇam*, 'a qualifier for that probans.' The accident belongs as a qualifier (*viśeṣaṇa*) to the probans, since it qualifies by way of restriction the locus of the probans.

165.4. *vadanti*, 'people say'. The people referred to are the followers of Prabhākara (M 165.10).

165.4–166.5. The second corollary justifies the definition of accident by showing that such an accident must be associated with the probans which deviates from the probandum.

165.5. *sādhanâvacchinna-sādhya-vyāpakatvam*, 'being a pervader of the probandum limited by the probans.' This is a refinement of the first part of the common definition of accident 'being a pervader of the probandum.' The probandum is limited (*avacchinna*) by the probans inasmuch as only that part of its locus is taken into account which is locus of the probans. This means that the accident is defined as an attribute which pervades the connected probans and probandum, i.e. which occurs in all those loci of the probandum in which the probans occurs (cf. 167.3). In defining thus an accident the definition covers all types of accident (cf. p. 15).

165.6–166.2. *vyabhicāriṇi...tatrôpādhiḥ.* There are cases of inference in which the probans deviates from the probandum. Then the probans occurs in some locus of the probandum and does not occur in some other locus of the probandum. This means that the probans is related both to

the probandum and to absence of the probandum. How is this possible? The probans is not connected with both the probandum and absence of the probandum in virtue of its own nature, because the probandum and its absence when related to the essence of the same thing exclude each other, i.e. are contradictories (cf. p. 9). Therefore there must be something that is the cause of, or the condition for, the probans' being connected with the probandum; if this condition is absent, the probandum will be absent from the locus of the probans, i.e. the probans will be connected with absence of the probandum. This cause or condition is the accident. The accident and its absence are therefore the limitors of the connexion of the probans respectively with the probandum and with absence of the probandum. The probans with the accident is pervaded by the probandum; the probans without the accident is pervaded by absence of the probandum. The latter statement logically implies that the probans with the probandum is pervaded by the accident. This is just what the definition of accident says (see preceding note). And what the definition further says, viz. that the accident does not pervade the probans, follows from the occurrence of the probans without the accident, which occurrence is necessitated by the occurrence of the probans without the probandum. The definition, therefore, contains nothing assailable.

166.3. *vyabhicāre câvaśyam upādhir iti.* Cf. 77.3–4.

166.3–5. *Anyathā...aprayojakatvāt.* From the mere fact that the probans deviates from the probandum G. deduces the presence of an accident, starting from what is assumed as self-evident, viz. that the probandum and its absence in relation to the same thing are contradictories (see preceding note). If his deduction were unconvincing (*agamaka*), we should not be entitled to make an inference of the form (M. 170.5) 'This reason (=probans) has an accident because it deviates (*ayaṃ hetuḥ sopādhir vyabhicāritvāt*)'; for such an inference would have no foundation, and therefore would be ineffective (*aprayojaka*), since there would be no evidence that a probans which deviates from the corresponding probandum has an accident.

166.4–5. *tad-anumānam*, i.e. the inferring of the accident.

166.5–168.3. The accident, in the presence of the probans, (1) is pervaded by the probandum and (2) pervades the probandum; (1) is implied in the etymological meaning of the word *upādhi*; (2) is stated in the definition of accident. This is the theme of the third corollary, which is con-

cerned with Udayana's theory of accident (M. 170.12, cf. ch. IV, § 5, note on 77.1–79.1).

166.5–167.2. *tasya...ucyate.* The use of *upādhi* to signify a concomitant originating a pervasion agrees with the etymology of the word. *upādhi* naturally means *appositio* (German: Beilegung), i.e. attribution. Its etymology is properly expressed in the phrase *upa samīpa-sthe ā-dadhāti* (M. 170.17), where *upa samīpa-sthe* means '*upa* in the sense of being near.' *upādhi* is that which places something upon what is near; i.e. it attributes something of itself to the thing of which it is a concomitant. This means that the thing attributed cannot attach to the essence of the thing to which it is attributed. Thus the *upādhi* itself is accidentally connected with the thing it accompanies; it is really an 'accident' for that thing. That thing is here the probans. That which is attributed to it is a pervasion by the probandum. The accident transfers to the probans a pervasion by the probandum. This pervasion belongs primarily to the accident, because the accident qua accident, i.e. the accident in so far it is connected with the probans, is pervaded by the probandum. For instance, wet fuel in connexion with fire is pervaded by smoke. But we can equally well say that the probans in so far it is connected with the accident is pervaded by the probandum. Fire in connexion with wet fuel is pervaded by smoke. Thus we have a transference (*saṃkrāmakatva*, M. 171.12, Dīdh. 539) of a pervasion from the accident to the probans; the probans is made subject of a pervasion whose original subject is the accident. This transference may lead to the error of thinking that the probans is really the subject of a pervasion by the probandum. There is only in appearance (*cakāsti*, 'shines') a pervasion of the probans by the probandum. In reality the so-called probans (*sādhanatâbhimata*) is not pervaded by the probandum, because it deviates from the probandum. The real subject of the pervasion is the accident qua accident, because the accident qua accident of the probans is pervaded by the probandum. This is expressed in G.'s language by saying that the accident (or the nature of the accident) limits the connexion with the probandum.

166.5–167.1. *sādhya-saṃbandhitâvacchedaka-rūpa-lakṣaṇā vyāptiḥ*, 'pervasion whose characteristic is a nature which limits the connexion with the probandum.' The nature which limits the connexion is the nature of the subject of pervasion (cf. 156.1 (§ 7)).

167.1. *sādhanatâbhimate*, cf. 165.2–3.

167.1–2. *sphaṭike javā-kusumavad.* The use of a comparison to suggest the true meaning of *upādhi* is common in Indian philosophy. In the Vedānta (we confine ourselves to Śaṃkara's Commentary on the Brahmasūtras) the name of *upādhi* is given to the limiting adjuncts (earth, body etc.) which ignorance (*avidyā*) assigns to the supreme being (*brahman* or *ātman*) in order to explain its (unreal) possession of wordly and individual attributes; the purely accidental connexion with these adjuncts is illustrated in the following way: (3.2.11) 'For it is not possible that a thing of a certain nature should have a different nature because of its connexion with accidents. The crystal, which is in itself clear, does not become dim through its connexion with an accident such as red lac; for it is altogether erroneous to believe that dimness can penetrate into it.' (*Na hy upādhi-yogād apy anyādṛśasya vastuno'nyādṛśaḥ svabhāvaḥ saṃbhavati. Na hi svacchaḥ san sphaṭiko'laktakâdy-upādhi-yogād asvaccho bhavati bhrama-mātratvād asvacchatâbhiniveśasya.*)

In the Sāṃkhya it is body, senses and intellect (*buddhi*) that in relation to the soul (*puruṣa*) are called *upādhi*; what belongs to their sphere, e.g. pain (*dukha*), does not really affect the soul, since it has only a reflexion (*pratibimba*) in the soul. This reflexion is compared with the reflexion of a Hibiscus flower in a crystal; the crystal looks as if it were red, and remains unaffected by the reflexion. The comparison is stated in Sāṃkhya-sūtra VI.28: 'As in the case of the Hibiscus and the crystal, there is no coloration (influence), but an erroneous assumption'. (*Japā-sphaṭikayor iva nôparāgah, kiṃ tv abhimānaḥ.*) In the commentary of Vijñānabhikṣu on Sāṃkhyasūtra I. 19 the following passage is significant for the meaning of *upādhi*: 'As the colouring of an essentially pure crystal does not take place without a Hibiscus being connected with the crystal, so the connexion of the soul, which is essentially pure etc., with pain does not take place without a connexion with some accident, since pain and other feelings cannot arise of themselves.' (*Yathā svabhāva-śuddhasya sphaṭikasya rāga-yogo na japā-yogaṃ vinā ghaṭate, tathâiva nitya-śuddhâdi-svabhāvasya puruṣasyôpādhi-saṃyogaṃ vinā duhkha-saṃyogo na ghaṭate, svato dukhâdy-asaṃbhavād (iti arthaḥ).*)

The Nyāya uses the same comparison with regard to accident as the Sāṃkhya does. In the first chapter of the Theory of accident (*upādhi-vāda*, 314.4–315.3) G. puts forward the following description of accident: 'That thing whose attribute is reflected elsewhere can surely be called accident,

for it is like the Hibiscus flower, which is accident when redness appears in the crystal. [As the redness which occurs in the Hibiscus flower shines by reflexion in the crystal], so the pervasion which occurs in the accident shines [by reflexion] in what is thought of as being a reason [(=probans)]. Therefore that thing is truly an accident.' (*Nanûpādhiḥ sa ucyate yad-dharmo'nyatra pratibiṃbate yathā javā-kusumaṃ sphaṭika-lauhitya upādhiḥ, tathā côpādhi-vṛtti-vyāpyatvaṃ hetutvâbhimate cakāsti, tenâsāv upādhih.*) The same idea is expressed in the present paragraph (166.5–167.2). But with G. we must remember that no comparison goes on all fours. The Hibiscus flower, with which the 'logical' accident is compared, possesses its redness independently of its being connected with a crystal, whereas, in general, the 'logical' accident is the subject of pervasion only in connexion with the probans whose accident it is; i.e., the accident qua accident of the probans is that which is pervaded by the probandum. For we cannot say that all wet fuel is pervaded by smoke; there is wet fuel in loci where there is no fire, and therefore no smoke.

167.2. *javā-kusuma. javā* or *japā*, Hibiscus rosa sinensis (China rose), is known for the redness of its flower, which in poetry serves to describe the colour of dawn and twilight (*saṃdhyā-rāgo javā-varṇaḥ*, Harivaṃsa 9703; *aruṇo garuḍa-bhrātā javā-puṣpa-sama-prabhaḥ*, id. 12507; *javâpīḍa-nibhas tāmro bāla-sūryaḥ*, Rāmāyana 5.3.48).

167.3–4. *Lakṣaṇaṃ tu... sādhanâvyāpakatvaṃ.* The definition of accident is complementary to the meaning of the word *upādhi.* The meaning of the word implies that, in the presence of the probans, the accident is pervaded by the probandum. The definition of accident now adds that the accident pervades the probandum, provided the probandum is connected with the probans. Thus the accident comes to be rightly described as an attribute which both pervades the probandum and is pervaded by the probandum, not absolutely but only in the presence of the probans (i.e. it is in loci of the probans that the reciprocal pervasion takes place).

167.3. *sādhya-sādhana-saṃbandha-vyāpaka*, 'pervading the connexion of probandum and probans,' i.e. occurring in all those loci of the probandum in which the probans occurs, i.e. pervading the probandum in the presence of the probans. The same was expressed by *sādhanâvacchinna-sādhya-vyāpaka* (165.5, 166.1–2).

167.4. *viṣama-vyāptas*, 'a pervasion term which is unequal to the other

term.' A term which both pervades another term and is pervaded by it is called *sama-vyāpta* (cf. ch. IV, § 6, note on 83.4). The opposite of this may be expressed by *viṣama-vyāpta*. Then *viṣama-vyāpta* is either (1) a term which pervades another term but is not pervaded by it, or (2) a term which is pervaded by another term but does not pervade it. Case (1) is to be preferred because of the context (cf. Dīdh. 540–541). It designates an attribute which, in the presence of the probans, pervades the probandum without being pervaded by it. Such an attribute is covered by the definition of accident.

167.4–5. *pravṛtti-nimittâbhāvāt*, 'because of the absence of the cause of application.' The cause of application (*pravṛtti-nimitta*, see ch. IV, § 10, note on 88.1) of the word *upādhi* is *upādhitva*, the notion of what is signified by *upādhi*. This notion primarily contains what the etymological meaning (*yoga*) of *upādhi*, as applied to a logical subject, implies, viz. being an attribute which, in the presence of the probans, is pervaded by the probandum (see note on 166.5–167.2). Now this notion is absent from the definition of accident, because the definition speaks of an attribute which, in the presence of the probans, pervades the probandum, without mentioning whether it is pervaded by the probandum or not. Such an attribute, which may be *viṣama-vyāpta*, should not be called *upādhi*, since it evidently does not answer to the notion of *upādhi*.

167.5–168.1. *Dūṣakatā ca tasya vyabhicārônnāyakatayā*. *tasya* refers to *viṣama-vyāpta* (M. 173.9) or to accident (cf. *tasya* in 166.5). We have seen that *viṣama-vyāpta* denotes an attribute which, in the presence of the probans, pervades the probandum without being pervaded by it. Such an attribute, as well as an accident, is said to be destructive (*dūṣaka*) inasmuch as it demonstrates deviation of the probans from the probandum – which means that it destroys pervasion of the probans by the probandum. That it demonstrates such deviation becomes evident if we treat it as the term which is defined in the definition of accident. Not only does the definition say: (1) the accident, in the presence of the probans, pervades the probandum, but it also says: (2) the accident does not pervade the probans, i.e. the probans deviates from the accident. Let the probans be A, the probandum B and the accident C. Statement (1) of the definition is: Wherever, in the presence of A, there is B there is C. Statement (2) is: Somewhere there is A and non-C. (1) implies: (3) Wherever, in the presence of A, there is non-C there is non-B. From (3) and (2) it follows: (4)

Somewhere there is A and non-B. (4) means that the probans deviates from the probandum. Thus the definition of accident contains the premisses which lead to the conclusion that the probans deviates from the probandum.

168.1–3. *Na ca...upādhitvâpatter iti.* If to be an accident (*upādhitva*, cf. note on 167.4–5) were the same as to demonstrate deviation of the probans from the probandum, and if there were no possibility of demonstrating such deviation except by the definition of accident, we could give the name of accident to what is merely expressed by that definition, without needing the additional assumption (implied by the etymological meaning of the word) that the accident, in the presence of the probans, is pervaded by the probandum. But G. puts forward two other ways in which such deviation may be demonstrated: (1) an ineffective inference, and (2) a probans which deviates from a pervader of the probandum; so that, if an accident were that which demonstrates deviation of the probans from the probandum, these two sources of such deviation would have to be called accidents; which is obviously absurd.

168.2. *aprayojaka*, 'ineffective', i.e. unsuitable for the drawing of the conclusion (cf. 166.5), refers to an inference in which the connexion of probans and probandum is not known to be a pervasion because its knowledge derives no support from a reductio ad impossibile. Reductio ad impossibile (*tarka*) is used to remove doubts and to make knowledge of pervasion certain. In the case of smoke and fire the reductio is as follows. Suppose that the proposition (1) 'Wherever there is smoke there is fire' is untrue. Then the proposition (2) 'Wherever there is no fire there is no smoke' will be untrue, and it will be true to say (3) 'Somewhere there is no fire, but there is smoke.' The last proposition, however, cannot be true, since we cannot conceive smoke without a cause and this cause, as experience tells us, can only be fire. Therefore (2) and (1) must be true, and the initial supposition is false.

But there are cases of inference in which our knowledge of the connexion of probans and probandum remains doubtful because no certainty is reached by means of a reductio ad impossibile. (G. gives an example in his chapter on *tarka*, 241.5–242.3.) Then we have not grasped a pervasion. And a connexion which has not been grasped as a pervasion cannot be a pervasion, and therefore constitutes a deviation. So an ineffective inference implies a demonstration of deviation.

168.2. *sādhya-vyāpaka-vyabhicārin*, i.e. a probans which deviates from a pervader of the probandum. What deviates from the pervader deviates from the pervaded thing, since what is no locus of the pervader cannot be a locus of the pervaded thing, locus of the pervaded thing being included in locus of the pervader. Therefore a probans which deviates from a pervader of the probandum deviates from the probandum itself.

An accident (=C), which is said to limit the connexion of the deviating probans (=A) with the probandum (=B), may be symbolically described as follows (A′x stands for (Ey) (Ay ∧ Ryx), B′x for (Ey) (By ∧ Syx), etc.):

(1) $(Ex)(A'x \wedge B'x) \wedge (Ex)(A'x \wedge \sim B'x) \wedge$
$\wedge (x)[(A'x \wedge C'x) \rightarrow B'x] \wedge (x)[(A'x \wedge \sim C'x) \rightarrow \sim B'x].$

(1) is equivalent to

(2) $(Ex)(A'x \wedge B'x) \wedge (Ex)(A'x \wedge \sim B'x) \wedge$
$\wedge (x)[(A'x \wedge B'x) \rightarrow C'x] \wedge (x)[(A'x \wedge \sim B'x) \rightarrow \sim C'x]$

and to

(3) $(Ex)(A'x \wedge B'x) \wedge (Ex)(A'x \wedge \sim B'x) \wedge$
$\wedge (x)[A'x \rightarrow (C'x \leftrightarrow B'x].$

(3) expresses that an accident is *sama-vyāpta* (note on 167.4). The definition (*lakṣaṇa*) of accident is

(4) $(x)[(A'x \wedge B'x) \rightarrow C'x] \wedge (Ex)(A'x \wedge B'x) \wedge (Ex)(A'x \wedge \sim C'x).$

(5) $\perp (1) \rightarrow (4)$

The transference of the pervasion-by-the-probandum, which transference takes place from the accident to the probans, may be represented by:

(6) $\perp (x)[A'x \rightarrow (C'x \rightarrow B'x)] \rightarrow (x)[C'x \rightarrow (A'x \rightarrow B'x)].$

The definition of accident demonstrates the deviation of the probans from the probandum. The proof is as follows:

(7) $\perp (4) \rightarrow \{(x)[(A'x \wedge \sim C'x) \rightarrow \sim B'x] \wedge (Ex)(A'x \wedge \sim C'x)\}$

(8) $\ldots \rightarrow (Ex)(A'x \wedge \sim B'x).$

Reductio ad impossibile (*tarka*) uses the following theorems:

(9) $\perp \sim(x)(A'x \rightarrow B'x) \rightarrow [\sim(x)(\sim B'x \rightarrow \sim A'x) \wedge$
$\wedge (Ex)(\sim B'x \wedge A'x)]$

(10) $\perp \sim(Ex)(\sim B'x \wedge A'x) \rightarrow [(x)(\sim B'x \rightarrow \sim A'x) \wedge$
$\wedge (x)(A'x \rightarrow B'x)]$.

That the probans which deviates from a pervader (=D) of the probandum deviates from the probandum is shown by the formula

(11) $\perp \{(x)(B'x \rightarrow D'x) \wedge (Ex)(A'x \wedge \sim D'x)\} \rightarrow$
$\rightarrow (Ex)(A'x \wedge \sim B'x)$.

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